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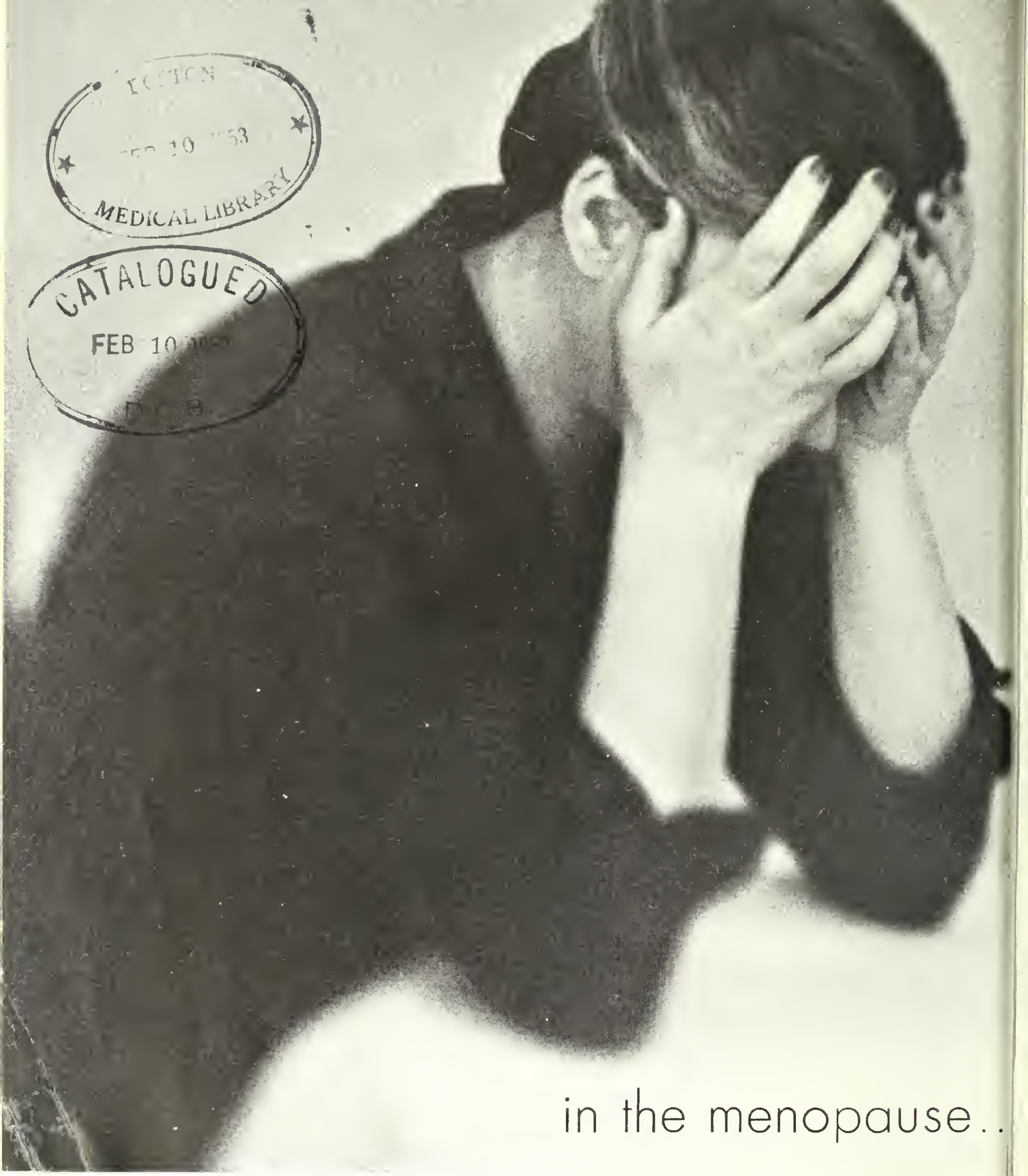

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Clinical Uses of the Artificial Kidney*

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Among the various types of acute renal failure are those in which recovery of renal function may be expected if the patient can be maintained through the acute episode. To aid in temporarily assuming some of the functions of the kidney during the period of acute failure a number of technics have been developed. The most promising of these have been peritoneal irrigation,[7,8,9] intestinal lavage[17,24] and the artificial kidney.

HISTORICAL REVIEW

While the development of a practical clinical model suitable for use in patients had to wait until 1944,[14] it is of interest that the basic principles inherent in all later artificial kidneys were first set forth in 1914 at which time Abel, Rowntree, and Turner,[1] working in the department of pharmacology at Johns Hopkins Medical school developed their process of "vivi-diffusion". They envisioned its ultimate clinical use in the patient with an accumulation of diffusable toxic substances. Their machine consisted of a series of celloidin tubes in a medium of saline with rubber tubes leading from the celloidin to cannulæ in an artery and a vein. Hirudin, an extract of leech heads, was their anticoagulant. They mentioned survivals in dogs after three hours of dialysis, and one animal lived during a 16-hour period of dialysis but died later. From their work they concluded that such non-protein substances as urea, sugar, phosphates and aspirin could be removed by the method. The work of these three men was monumental in establishing a base line for the future development of artificial kidneys.

Between 1914 and 1944 when Kolff[14] in the Netherlands reported the use of an artificial kidney in human patients, there was a gradual evolution toward a more practical machine. Heparin proved to be a much more reliable and safe anticoagulant than hirudin, and cellophane was shown in 1937 to be superior in both strength and uniformity to celloidin or other dialyzing membranes in use at the time. In 1944 Kolff introduced a new type of artificial kidney with cellophane tubing wrapped on a revolving drum providing a much greater dialyzing area than had been possible in earlier models. In one case report in which short dialyzing periods were used it succeeded in removing 20 to 40 grams of urea a day from a patient with chronic nephritis. This machine was criticized by Alwall[2] who in 1947 had developed another artificial kidney model. Alwall claimed first, that the Kolff kidney traumatized the red cells because it was necessary to use a pump, secondly, that the colloid osmotic pressure of the blood was not equalized resulting in a fluid loss and, finally, that the Kolff machine was excessively complicated. Alwall's machine consisted of a cellophane tube wrapped on a grooved cylinder, with another cylinder placed outside this at a distance calculated to keep the pressure on the blood in the cellophane tubing about equal to the colloid osmotic pressure.

Independently, Murray of Canada[22] developed and used clinically an artificial kidney consisting of small diameter cellophane tubing wrapped around a stationary vertical cylinder immersed in a bath. The blood was pumped from the inferior vena cava and allowed to run back into another vein.

A different type of artificial kidney was recently introduced by Skeggs and Leonard[27] in 1948. Their machine had rubber pads treated with silicone between which were sheets of cellophane. Blood flowed on one side of the cellophane and dialyzing solution on the other. They claimed full therapeutic potency with several of these "units" in tandem, but most of their work has been of an experimental nature.

A more extensive review of the literature pertinent to the development of the artificial kidney can be obtained

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TABLE I

CONSTITUENTS OF THE BATH FLUID

(Gm./Liter of Tap Water)

Na Cl	6.60	
Na HCO_3	2.25	
K Cl	.30	
Ca Cl_2	.40	
Mg Cl_2	.10	
Glucose	10.00	
Total Na + in Meq/L		140.00
Total Cl — in Meq/L		126.00

from some of the articles listed in the bibliography, among which that of Norvitt[23] is of special merit.

TECHNICAL CONSIDERATIONS

The apparatus we have used is a modification of the Kolff artificial kidney* developed by Merrill.[18] It consists essentially of a large rotating wire mesh drum around which is wrapped in a spiral fashion 120 feet of cellophane tubing. The patient's blood leaves the cannulated radial artery in a plastic tube, passes through a rotating coupling in the axle of the drum, and enters one end of the cellophane tubing where rotation of the drum combined with the effect of gravity moves the blood through its length. At the far end of the drum the stream of blood leaves through a second rotating plastic coupling and is elevated by a pump to a burette from which it flows by gravity through a clot catcher and down into the patient's cannulated antecubital vein.

The rotating drum is partially immersed in a 100-liter bath wherein the dialysis takes place. This bath is tap water, usually containing the constituents listed in table I. These may be varied in each case depending upon the chemical concentrations in the patient's blood and his state of hydration. To assure an adequate diffusion gradient, the entire bath is changed after three hours of the usual six-hour dialysis. The bath water is kept at a temperature of 101° F with thermostatically controlled heating units, thus assuring return of blood to the patient at approximately body temperature.

The plastic tubing and glassware are sterilized in a steam autoclave, the cellophane tubing is boiled for 30 minutes, and the plastic couplings and burette are soaked in aqueous zepharin for 24 hours. Because the cellophane tubing is impermeable to bacteria and viruses, sterilization of the bath water is unnecessary.

Clotting of blood in the machine is prevented by heparinizing the patient and allowing the blood to come in contact with only plastic tubing, plastic connections, and silicone-treated[12] glassware. The average adult patients were given from 180 to 220 mg. of heparin during a six-hour period of dialysis. Oozing of blood from the wounds of the arterial and venous dissections was occasionally troublesome but in no case did a large hemorrhage occur. Nevertheless, we have considered serious recent hemorrhage such as massive hematemesis or melena, a contraindication to use of the artificial kidney.

Hemolysis produced by the artificial kidney has been no problem in our experience nor in that of others who have used this apparatus. The same precautions and use of materials which lessen the likelihood of clotting also reduce the probability of hemolysis.

In preparation for connecting the apparatus to the patient, the radial artery and a large antecubital vein are isolated through small incisions under local anesthesia, and at the same time the assembled machine is being irrigated with saline and tested for leakage. Then while silicone-treated glass cannulæ are inserted into the artery and vein, the artificial kidney is charged with 500 to 600 cc. of crossmatched blood, finally the vein and artery are connected to the machine, and inflow and outflow are started simultaneously. Flow of blood through the apparatus is adjusted to a rate of 150 to 200 cc. a minute by tunnel clamps on the inflow and outflow tubes. The flow is measured by observing the rate of blood level rise in the burette when its outflow is clamped, and an unbalanced arterial flow is detected by observing the amount of distention in the distal cellophane spirals.

RESULTS

1. *Clinical Changes During the Dialysis*:

During the period of dialysis, certain changes in the patients have been noted. Those not comatose were understandably apprehensive at first but even without sedation they soon became drowsy and frequently slept through most of the procedure. This sedative effect is unexplained at present. It occurred more rapidly than changes in the level of blood chemistries measured and it disappeared when the dialysis was terminated, though at this time changes produced in the blood chemistries were maximal.

A more lasting effect was an increase in mental alertness and sense of well-being noted in most patients when they were aroused near the end of the dialysis. Occasionally comatose patients became aware of their surroundings and were able to recognize and speak to their relatives. These evidences of clinical improvement roughly paralleled the changes produced in blood chemistries though a simple chemical explanation is unlikely, for it has been amply demonstrated that changes in individual blood electrolytes or metabolites do not cause the symptom complex of uremia.[10,25]

A temporary elevation of blood pressure during dialysis was occasionally observed, with the systolic pressure rising 40 mm. of mercury or more above the initial values during nine out of 24 dialyzing procedures. The diastolic pressure did not rise correspondingly and there was little change in pulse rate in these cases. A similar hypertensive response was noted by Merrill, et al,[19] and cardiac output studies in one of their cases led them to believe that a peripheral arteriolar constriction was the mechanism responsible for the elevated blood pressure.

2. *Patients Treated and Ultimate Effects*:

To date the artificial kidney has been used here 26 times on 15 patients afflicted with various acute or

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*Manufactured by Edward A. Olson, Ashland, Massachusetts.

Table II

PATIENTS TREATED WITH ARTIFICIAL KIDNEY

No.	Pt.	Sex	Age	Diagnosis and Complications	Procedure Number	Results	Living 1 Mo. Later	Days of Anuria*	Days of Oliguria
1	A.H.	F	70	Renal tubular and vascular disease; cancer of breast postop.; mediastinitis; pulmonary embolism	1	Died 24 hours after dialysis; immediate clinical improvement	No	5	3
2	C.K.	F	48	Lower nephron-nephrosis; postop. resection of recurrent cancer peritonitis; pancreatitis	2, 3 4, 5, 6	Died 24 hours after last dialysis; life may have been prolonged	No.	15	8
3	H.R.	F	37	Malignant hypertension with uremia	7	Died 27 days after dialysis; immediate result was good	No	0	0
4	I.R.	F	47	Polycystic disease of kidneys and liver	8	Immediate results good; died 4 months later	Yes	0	0
5	R.T.	M	57	Lower nephron-nephrosis; postop. bile duct exploration; peritonitis; liver necrosis	9, 10 11	Immediate results good after each dialysis; diuresis did not occur	No	22	0
6	O.R.	M	62	Vesicle neck obstruction; B.P.H.; bilateral pyohydronephrosis	12	Immediate result good; died later of uremia	Yes	0	0
7	E.J.	F	44	Encephalitis, acute liver necrosis, diabetic acidosis	13	Died a few hours later	No	0	? (2+)
8	K.O.	M	22	Subacute glomerular nephritis; hemorrhagic pneumonia	14	Dialysis satisfactory; patient died 36 hours later	No	13	?
9	D.D.	M	14	Aplasia of right kidney and hydronephrosis of left; pyelitis	15 16	Dialysis used twice in preparation for surgery; convulsions after second run; intestinal loop made	Yes	0	0
10	E.E.	M	52	Acute renal failure; postop. liver resection for cancer of gallbladder; subphrenic abscess	17	Died 24 hours later	No	3	5
11	J.S.	M	58	Cirrhosis of the liver; hepatic coma; cancer of the liver	18	Partially aroused from coma after dialysis	No	0	0
12	W.N.	M	14	Chronic glomerular nephritis in late stage; pulmonary edema	19	Developed convulsions and died before dialysis was completed	No	0	0
13	W.S.	M	19	Lower nephron-nephrosis; traumatic laceration of right kidney; retroperitoneal hemorrhage; bleeding peptic ulcer; peritonitis	20, 21	Immediate response good; died 6 days after last dialysis	No	12	5
14	D.Z.	F	36	Lower nephron-nephrosis; transfusion following hemorrhage from uterus; pulmonary edema	22	Excellent; complete recovery	Yes	9	2
15	E.C.	M	8	Acute glomerular nephritis	23, 24 25, 26	Immediate results good	?	52+	0

*Anuria = less than 100 cc. urine a day.
Oliguria = 100 to 300 cc. urine a day.

chronic diseases. The results are summarized in table II. In most cases the immediate results have been good but it has been seldom that the ultimate course of the disease has been distinctly modified. This is in large degree due to the type of patient we have treated, for those with chronic diseases were generally in the terminal stages of their illness and most of those with acute renal failure, which we have treated, suffered from a number of additional complications which frequently cause death even in the face of good renal function. We have not limited our use of this apparatus to the infrequent case in which recovery might fairly be expected but have attempted to explore its usefulness in a rather wide variety of desperate situations.

Six patients treated were suffering from acute renal failure of the type known as lower nephron-nephrosis[16] and characterized pathologically by tubular damage and occlusion. One of these (No. 14) had a reaction following a blood transfusion which was given for hemorrhage from uterine myomata, and recovered completely after a

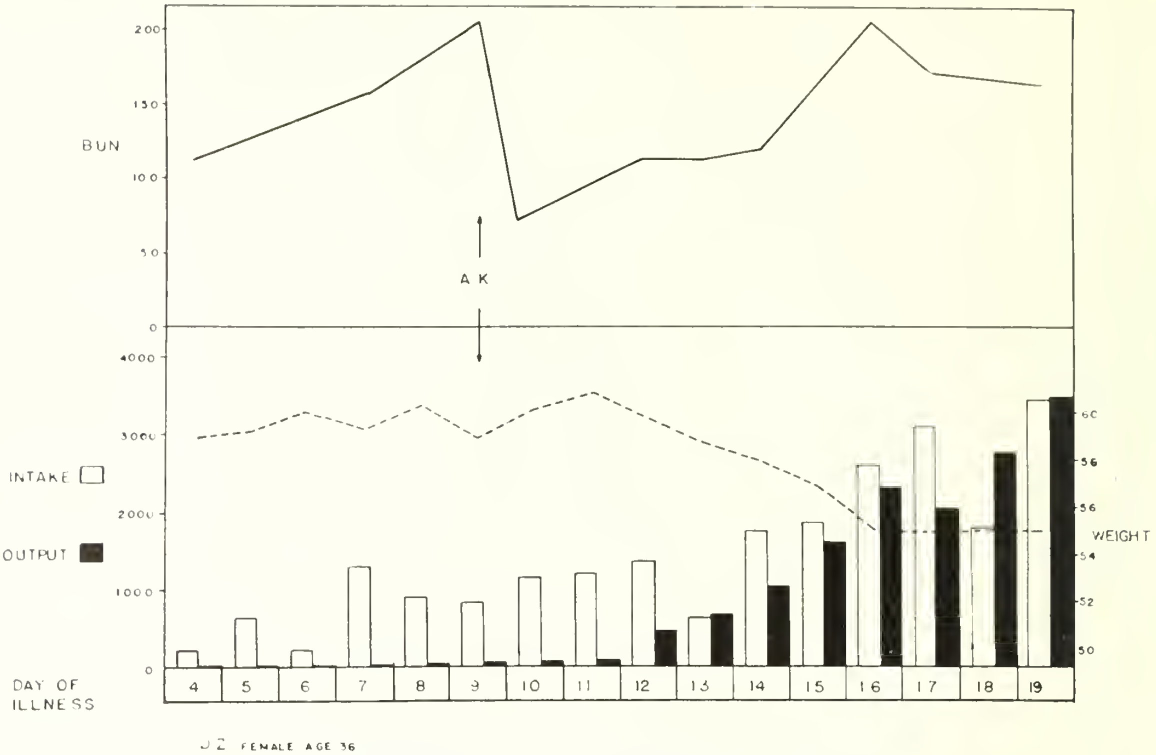

Fig. 1. Patient suffering from anuria following a blood transfusion. A.K. indicates treatment with the artificial kidney.

stormy course. It was felt that the artificial kidney was of distinct benefit in her case. Some aspects of her clinical course are depicted in figure 1, which shows the drop in blood urea nitrogen brought about by use of the artificial kidney and the diuresis beginning on the 12th day which heralded recovery. A second patient (No. 13) developed anuria following a motorcycle accident and ultimately died with a traumatically destroyed right kidney and lower nephron-nephrosis of the left kidney. An interesting feature of his disease was the occurrence of massive hemorrhage from what appeared at autopsy to be an acute peptic ulcer. Four patients (Nos. 1, 2, 5 and 10) developed anuria after extensive surgery. In two of these it was felt that life was prolonged by use of the artificial kidney but all ultimately died with grave complications.

In addition to the six patients described above, we treated two other patients suffering from acute renal failure, one had subacute glomerular nephritis and the other is presumed to have acute glomerular nephritis. The patient with subacute glomerular nephritis (No. 8) succumbed with a hemorrhagic pneumonia which was thought to be pulmonary edema before autopsy. The other, an 8-year-old boy (No. 15), has survived 52 days of anuria and four dialyses at this writing and is still in good clinical condition. His clinical course is depicted in figure 2 which shows the effect of four treatments with the artificial kidney on his blood urea nitrogen level and the consistently low urine output. Since the last use of the artificial kidney his urine output has remained low and his blood urea nitrogen has risen to a level of 94 mg. per cent. Another dialysis with the artificial kidney is planned.*

Five patients suffering from various types of chronic renal disease have been treated with the artificial kidney and in four of them (Nos. 3, 4, 6 and 9) some temporary benefit was gained. The fifth patient, a child who was in the terminal stages of chronic renal failure, expired following a series of convulsions while undergoing dialysis. Though he gained only 0.5 kg. in body weight while attached to the artificial kidney, he was considered to be slightly overweight beforehand and we feel that more intensive efforts to dehydrate him during the dialysis were in order. Unfortunately, autopsy was not granted and other mechanisms explaining his sudden death may remain hidden. Of the four patients who obtained a temporary benefit from use of the artificial kidney, one child, who had congenital renal aplasia and hydronephrosis, was twice prepared for surgery and at the second operation an intestinal loop was made for perfusion, as has been suggested by Kolff.[15,29] Despite these efforts the patient finally died. It is possible that the other three patients with chronic uremia may have survived longer if the artificial kidney had been used

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*This boy finally died following 84 days of anuria and six treatments with the artificial kidney. At autopsy he had severe chronic glomerular nephritis.

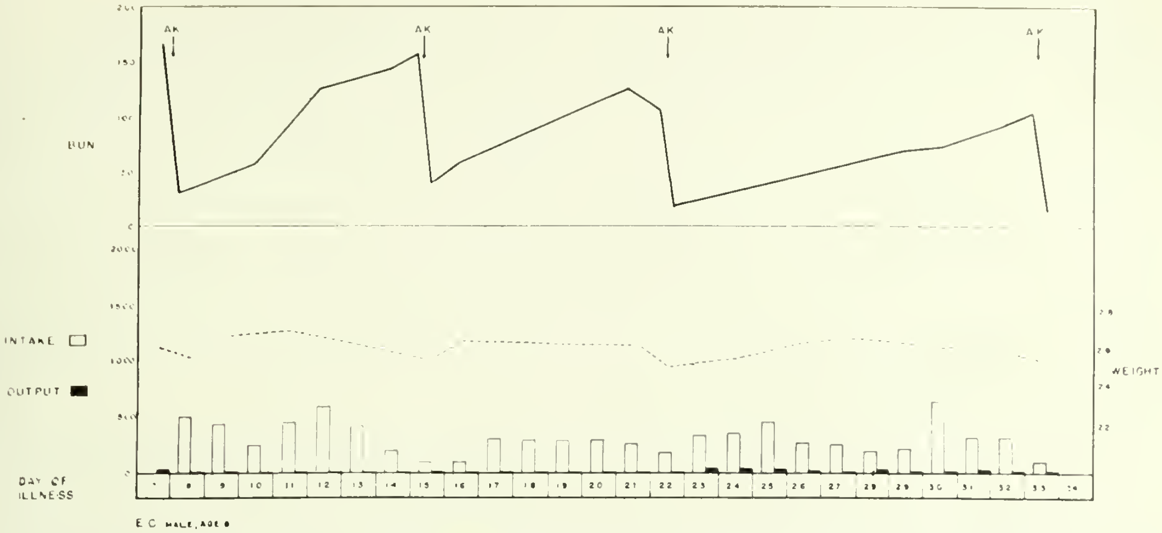

Fig. 2. Patient presumed to have acute glomerularnephritis. A.K. indicates treatment with the artificial kidney. This child has survived 52 days of anuria.

repeatedly rather than just once, though of course the real value of such palliation may be held in question.

Two other patients have been treated with the artificial kidney (Nos. 7 and 11); one had cirrhosis with carcinoma of the liver and the other had encephalitis with diabetic acidosis. Although the patient with cirrhosis showed an increased mental alertness lasting a few hours after dialysis, both succumbed rapidly to their diseases.

Table III

FALL IN BLOOD UREA NITROGEN AND UREA REMOVED IN THE BATH WITH USE OF THE ARTIFICIAL KIDNEY

Patient	Initial BUN (mg. %)	Final BUN (mg. %)	Urea N removed (gm.)	Urea removed (gm.)
A.H.	120	85	33	71
C.K. (1)	119	46	33	71
(2)	148	43	36	77
(3)	105	19	28	60
(4)	151	64	24	51
H.R.	105	59	33	71
I.R.	130	46	36	77
R.T. (1)	93	44	33	71
(2)	154	58	38	82
(3)	227	66	41	88
O.R.	208	66	55	118
E.J.	88	33	23	49
K.O.	170	88	52	112
D.D. (1)	140	41	26	56
(2)	180	43	33	71
E.E.	125	45	37	79
W.S. (1)	278	92	92	197
(2)	232	75	73	157
D.Z.	205	72	50	107
E.C. (1)	166	30	25	54
(2)	158	38	25	54
(3)	105	22	20	43
(4)	108	15	29	62

3. *Blood Urea Levels and Urea Recovery in the Bath*:

Though it is recognized[10,25] that high blood urea levels alone do not cause the clinical picture of uremia, fall in blood urea is directly correlated with clinical improvement and, in addition, is a good measure of the efficiency of an artificial kidney. In table III the blood urea nitrogen drop and the amount of urea removed in the bath are shown for each case in which a satisfactory six-hour dialysis was obtained. This table includes all but two occasions when the artificial kidney was used. During each of these satisfactory treatments a gratifying reduction in blood urea nitrogen was obtained, with the removal of up to 197 grams of urea in the bath.

The blood urea nitrogen values returned to their former levels at variable rates after dialysis. In the patients with acute uremia having very low urine outputs, this

Table IV

REDUCTION IN SERUM POTASSIUM WITH USE OF THE ARTIFICIAL KIDNEY

Patient	Serum Potassium before Dialysis	Serum Potassium after Dialysis
A.H.	6.7	4.3
C.K. (1)	6.9	4.0
(3)	7.8	4.7
(4)	5.9	5.3
H.R.	7.2	4.6
I.R.	5.6	3.7
O.R.	7.3	4.3
E.J.	5.6	3.6
K.O.	8.4	4.4
D.D.	6.0	4.8
W.S.	4.2	2.5
D.Z.	7.6	3.6

usually took place within five to seven days while, as might be expected, in those with chronic uremia and a good urine volume the rise in blood urea nitrogen occurred much more slowly and occasionally took several weeks.

4. *Other Changes in the Blood Chemistries*:

In renal failure, and especially when the urine output is very low and increased tissue break-down is taking place, the serum potassium levels may rise to high values.[11] In these cases death may be hastened by the toxic action of potassium on the heart.[4,5,6,13]. To avoid this eventuality in the uremic patient the artificial kidney provides the most efficient method of rapidly lowering the serum potassium concentration. Using the artificial kidney on dogs, it is possible to extract more potassium than would be expected in the total extracellular fluid at the beginning of the dialysis.[26] We have demonstrated this in patients as well. Yet, despite this relatively great extraction of potassium, the serum levels do not fall to dangerously low levels, doubtless because of a shift from the intracellular space.

On twelve occasions when the artificial kidney was used, potassium was omitted from the bath water during half or all of the dialyzing period in order to reduce high serum potassium levels. As is shown in table IV, an adequate reduction in serum potassium was obtained in every instance. A return toward normal in the electrocardiographic tracings paralleled the fall in serum potassium levels.

The other blood metabolites and electrolytes, measured before and after use of the artificial kidney, all shifted toward their normal levels during dialysis. Decreases in creatinine and uric acid paralleled those of blood urea nitrogen. The low bicarbonate levels customarily found before dialysis as an indication of metabolic acidosis were elevated toward the normal value, but usually some acidosis remained. Blood chloride concentrations were easily adjusted, and the hypochloremia found almost uniformly beforehand was completely corrected or overcorrected in every case without danger of the over-hydration which may follow attempts to correct hypochloremia by use of intravenous salt solutions in oliguric patients. The low serum sodium values found in most of the patients treated were elevated to the normal range regularly and the one patient with a hypernatremia had a fall in his serum sodium from 185 to 161 milliequivalents per liter. It is important to note that this fall in sodium concentration was accompanied by a decrease in body weight. Blood calcium concentrations, which were usually low before dialysis, were raised to normal or above normal by the procedure and phosphorus levels fell toward but never quite to normal.

5. *Overhydration*:

Overhydration is a common complication of acute renal failure, usually due to the overzealous administration of parenteral fluids. A number of our patients had both peripheral and pulmonary edema before they were treated with the artificial kidney. This complication is so serious that it has been indicted as a more important cause of death in acute renal insufficiency than nitrogen retention or acidosis.[28]

TABLE V

BODY WEIGHTS BEFORE AND AFTER DIALYSIS.
(Dehydration attempted)

Patient	Body Weight Before (Kg.)	Body Weight After (Kg.)
C.K. (1)	62.4	61.0
(2)	60.2	57.5
H.R.	61.8	58.8
I.R.	50.2	49.6
R.T.	67.3	63.2
K.O.	67.5	64.3
E.E.	57.2	56.7
E.C.	25.9	25.4

It is possible, with proper use of the artificial kidney, to effect a rapid dehydration in these patients. This is done by making the bath hypertonic through the addition of glucose in amounts sufficient to make a concentration up to 2 or 2½ per cent. When these high concentrations of glucose were used, small doses of insulin were given during the procedure to lower the blood sugar and thus keep a high differential gradient between the bath and the patient's blood. Incidentally, the glycogenesis brought about by this technic may have been helpful to the patient's liver. In controlling dehydration during dialysis we have found frequent determinations of body weight of some value.

Listed in table V are body weights before and after dialysis taken on those occasions when dehydration was attempted. All of these patients lost weight, the largest amount being 4 kilograms during a six-hour dialysis in a grossly over-hydrated, anuric, comatose man who showed a striking diminution in his mental stupor during and after use of the artificial kidney. Some of the other patients in this group might have benefited more if even greater efforts had been made to bring about a rapid dehydration with the artificial kidney and, it is doubtless true, that efforts at dehydration should have been made in a few additional patients on whom overhydration before dialysis was not easily detected.

DISCUSSION

The importance of good conservative management for patients treated with the artificial kidney cannot be overemphasized. Correction of anemia and adequate nutrition are both important aspects of the treatment, but of even greater importance in the careful avoidance of overhydration during the anuric phase of the disease. In fact, it is probably true that development of the so-called "three-phase" conservative management of patients with acute renal insufficiency,[3,20,21,28] has been more important in lowering the fatality rate of lower nephron-nephrosis than perfection of the artificial kidney, peritoneal dialysis, or intestinal lavage.

It is interesting, as pointed out by Strauss,[28] that during the early part of the century there were a number of case reports of individuals who lived three or more weeks, while anuric, yet in recent years the fatality rate of lower nephron-nephrosis was considered to be 90 per cent and in Lucke's series none survived more than 20 days of oliguria.[16] Strauss attributed this difference to the fact that intravenous fluids were not used by the earlier reporters and were used too liberally in later years. At the present time, with judicious management and without additional complicating factors, the prognosis for acute renal insufficiency due to lower nephron-nephrosis should be good even without use of the artificial kidney.

The question then is: What cases of acute renal insufficiency, if any, should be subjected to use of the artificial kidney? No doubt its use will continue to be suggested as a desperate last chance measure in the terminally ill patient with anuria, and we shall still accept such candidates with perhaps little anticipation of improving upon our present poor record. However, there is hope of benefiting many patients if they are treated earlier in the course of their disease. Certainly it would appear that the development of hyperkalemia or definite overhydration in cases of acute renal insufficiency are valid indications for treatment with the artificial kidney, for dialysis offers the most rapid and efficient method of correcting these dangerous complications.

Further, we feel that oliguria or anuria of over five or six days' duration should suggest treatment with the artificial kidney. Most of the reported cases of lower nephron-nephrosis which were successfully treated by conservative methods alone began to have diuresis after four to ten days of low urine output[3,21] which fact implies that patients showing no indication of an increase in urine output after six days may need the help of the artificial kidney. In fact, in our own experience with patients who developed postoperative oliguria, none who received only conservative treatment during the past two years has survived more than ten days of anuria or oliguria whereas, as may be seen in table II, with use of the artificial kidney two similar patients survived over 20 days of low urine output.

In patients with chronic uremia the artificial kidney has a limited usefulness. It might be an aid in preparing some of these for operations which may be needed to correct the defects which have led to their uremia. Some temporary benefit has also been obtained for patients suffering from non-surgical types of chronic uremia but the ultimate course of their illness has not been changed.

We have had no success with use of the artificial kidney in treating one case with cirrhosis and hepatic coma and have, as yet, gained no experience in treating some of the other clinical conditions for which its use has been suggested, such as barbiturate poisoning and certain shock-like states.[19]

SUMMARY AND CONCLUSIONS

1. An artificial kidney used at the University of Minnesota Hospitals during the past year and the technical aspects of its application have been described.

2. This apparatus has been used 26 times in the treatment of 15 patients. Eight of these patients had acute renal failure of various types, five had chronic renal failure, one had hepatic cirrhosis, and one had encephalitis complicated by diabetic acidosis.

Most of these patients were temporarily benefited by treatment with the artificial kidney. A prompt lowering of the protein metabolite levels in the blood and an adjustment of the serum electrolyte levels toward normal was obtained in every case. It was possible to reduce the body weight when overhydration was present.

4. It is suggested that the artificial kidney be used in those cases of acute renal failure where hyperkalemia or overhydration has developed and when oliguria has persisted for over six days. In patients with chronic uremia the artificial kidney may be helpful in preparing suitable candidates for surgery.

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(Continued on page 48)

Amyloid Disease*

With Two Case Reports

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In 1935 Reimann, Kouchy and Eklund[1] offered the following classification of amyloid disease: (1) primary amyloidosis, (2) secondary amyloidosis, (3) amyloidosis associated with multiple myeloma, and (4) localized or tumor forming amyloidosis.

Primary amyloidosis is a diagnosis of exclusion. It represents cases where amyloid is usually deposited in the cardiovascular system, the genito-urinary tract, smooth and skeletal muscle, and in which there is an absence of known etiologic factors.

In secondary amyloidosis the amyloid is usually deposited in parenchymal organs, principally the liver, spleen, adrenal glands and kidneys. There is co-existing suppurative disease, tuberculosis or carcinoma (especially carcinoma of the lung or stomach).

In amyloidosis associated with multiple myeloma the amyloid usually is distributed in parenchymal organs as it is in secondary amyloidosis.

The localized form of the disease is similar to the primary type and is characterized by small or large tumors of amyloid, single or multiple, and is usually located in the naso-pharynx, or respiratory tree. It may be also encountered in the subcutaneous tissues, about the eyes, in bone or in the urinary bladder.

The primary form of the disease is rare[2] and until 1948 only 63 such cases had been reported in the literature. Cases of amyloidosis have been encountered in which deposition of the amyloid has been in the liver and spleen without known etiologic factors. Conversely the distribution of amyloid in the usual sites of the primary form has been seen in the presence of suppurative processes, tuberculosis and carcinoma. These unusual forms of the disease have been encountered frequently enough to prompt Lubarsch[3] to suggest the terms *atypical* and *typical* amyloidosis.

In this classification typical amyloidosis includes all cases of the disease in which the amyloid is deposited in the usual sites (liver, spleen, kidneys, adrenals) with little or no amyloid in other organs. In atypical amyloidosis the usual sites are spared entirely, or for the most part, and amyloid is deposited rather extensively in one or more unusual locations. In either form there may or may not be an associated disease. This makes possible such diagnoses as typical or atypical amyloidosis associated with multiple myeloma or tuberculosis; atypical local amyloidosis of the skin, heart or pancreas; or typical amyloid without associated disease.

King[4] in 1948 and Whittlesey[5] in 1950 further simplified and clarified amyloidosis by proposing the following:

King:
- Typical amyloidosis
  - a. Associated with other diseases
  - b. Not associated with other diseases
- Atypical amyloidosis
  - a. Associated with other diseases
  - b. Not associated with other diseases

Whittlesey:
- Primary amyloidosis
  - a. Typical
  - b. Atypical
- Secondary amyloidosis
  - a. Typical
  - b. Atypical

The two cases we are presenting fit best into one of the two latter classifications.

PATHOLOGY

The mechanism for the formation of amyloid is not known. According to Krawkow it is a protein substance which contains chondroitin-sulfuric acid. Grossly, the organs involved may be of normal size or greatly increased, depending on how much amyloid is present. Where large amounts are encountered the organ has a waxy appearance and feel.

Application of Lugol's solution to the cut surface imparts a mahogany brown color to the amyloid deposits. Addition of dilute sulfuric acid may cause the color to turn to a blue black. Microscopically amyloid appears as a hyaline-like substance. With H. and E. stain it is indistinguishable from hyaline but usually stains a paler red. With only H. and E. stain diagnosis can be made on the fact that amyloid is *not* deposited in the cell but is seen in the *inter*-cellular tissues. When deposited in large amounts adjacent parenchymal cells are compressed and atrophy and necrosis result, a condition best seen in the liver and adrenals. Amyloid accumulates in the walls of blood vessels where it may narrow the lumen of the vessel sufficiently to cut off nutrition, resulting in fatty and hyaline degeneration changes as well as atrophy and necrosis. This is best observed in the kidneys.

Special stains confirm the diagnosis when amyloid is deposited in unusual sites or when the amount of amyloid deposited is small. Methyl violet stains amyloid violet; and congo-red, stains salmon pink. This affinity of amyloid for congo-red is the basis for the intravenous congo-red test used clinically.

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CASE REPORTS

Case 1. A. H., a 65-year-old farmer, was first seen at our clinic on February 1, 1949, complaining of difficulty in breathing, which he described as "like a heevy horse," and which dated back to June 1948 when he had a rather severe cold. Since that time he had a persistent non-productive cough and progressive exertional dyspnea. He could lie flat on his back with complete comfort but the least exertion provoked marked dyspnea. He had been to several physicians with little benefit. Correspondence with one group revealed that he had had a rather extensive investigation including x-ray films of his chest, bronchoscopic examination, and study of his sputum for neoplastic cells and acid-fast bacilli. No bronchial lesions or malignant cells were found in his sputum or bronchial washings.

Examination revealed a rather emaciated male who appeared chronically ill. The blood pressure was 180/84; a few rales were heard over the left chest posteriorly. Examination of the heart was interpreted as being entirely negative. An x-ray film of the chest showed a patchy fibrosis throughout both lung fields with several zones of thickened pleura especially in the right chest. There was some prominence of the left ventricle, but the heart size was within normal limits. There were many zones of emphysema which simulated so-called cystic disease of the lung. The hilar lymph nodes were calcified. Fluoroscopic studies along with special views of the chest were interpreted as manifesting a diffuse fibrosis of the lung field. Hemoglobin was 13.4 gm. with 4.02 red cells and 5,800 white cells. Sedimentation rate was 52 mm. in one hour. The Mazzini test for syphilis was negative. The sputum was examined for neoplastic cells and none were seen. The urinalysis was negative.

The patient was placed on a regime of restricted activity and given Oeschner's mixture, but received little benefit. He was next given a trial of penicillin inhalation therapy and again he received little help. During the next six months he had progressive exertional dyspnea coupled with weakness, a feeling of fullness in the stomach with vague abdominal distress apparently aggravated by constipation. No cyanosis was noted. He became anorexic and lost 20 pounds in the six-month period. He noted no peripheral edema.

The patient was re-admitted to the hospital on February 11, 1950. Physical examination revealed crackly rales over the entire lung fields anteriorly and posteriorly. A tachycardia was noted. No cardiac murmurs were heard. X-ray examination at this time revealed findings similar to, but more marked than, previous studies. Thickened pleura and fibrosis were prominent. A fairly broad mediastinal shadow was noted. Hemoglobin was 16.2 gm. and white cells were 10,900. Gastro-intestinal studies were interpreted as negative. Serum protein was 6.54 mg. per cent, sedimentation rate was 35 mm., CO_2 combining power was 48 vol. per cent, serum amylase was 134, and serum chlorides 544.

Agglutination for undulant fever was negative. Sputum examination for neoplastic cells was reported as negative. Tuberculin skin test was negative. A small node discovered in the left axilla was removed with a piece of the pectoral muscle for biopsy. The pathologist reported amyloidosis of the lymph node and striated muscle. Further study included: normal bone marrow study, a positive skin test for coccidioidomycosis, negative urinalysis, and negative studies for fungi in the sputum. An electrocardiogram revealed left axis deviation. The patient deteriorated quite rapidly; anorexia became prominent. He maintained a persistent tachycardia. He became progressively weaker and died of inanition and cachexia March 25, 1950, two years after the onset of illness.

Postmortem examination revealed a bilateral, diffuse carcinomatosis of the lung. There was amyloid deposited in the muscle, lymph nodes and kidneys. Renal changes included minimal deposition of amyloid in the walls of the arterioles with moderate to marked cloudy swelling of the proximal and distal renal tubules. There was no amyloid demonstrated in the liver, spleen or adrenals.

Comment. This case of amyloidosis demonstrates a primary type of distribution associated with a diffuse carcinoma of the lung. It is unusual in that amyloid disease secondary to suppurative disease, tuberculosis, or neoplastic disease is usually associated with amyloid deposition in the *usual* sites (liver, spleen, adrenals and kidneys). According to Lubarsch's categories, this case would be classified as atypical amyloidosis associated with diffuse carcinomatosis of the lung. According to Whittlesey's classification it represents a case of secondary atypical amyloidosis.

Case 2. J. O. S., a 38-year-old farmer, was first seen at the clinic on February 28, 1949, with the following history. His maternal grandmother had diabetes mellitus. He had been married seven years, but had no children. He had had influenza in 1919. A diagnosis of rheumatic fever had been made in 1940. He was told there were no cardiac murmurs complicating the illness. He smoked one package of cigarettes a day and drank no alcohol except at social functions. He was referred to our clinic by his local physician because of diffuse abdominal pain, weight loss, progressive weakness, nausea, vomiting, and epistaxis of one month's duration. He had been feeling perfectly well up until January 20, 1949, when he first noted nausea but no vomiting. He complained of progressive generalized weakness, became anorexic and lost an unknown amount of weight. He consulted his local physician who discovered albumin in his urine. He was placed at bed rest. The albuminurea persisted and was associated with malaise, backache and nausea.

He was hospitalized elsewhere and an intravenous pyelogram was made. He said that after this procedure he grew progressively worse and became aware of a constant vague but severe diffuse abdominal pain. During the next five weeks he lost 25 pounds and became progressively weaker. He was unable to relax or sleep. Nausea became a most prominent feature, and he complained of backache. For the month prior to admission at the clinic he had frequent epistaxis and noted a spider nevus on the tip of his nose. His wife thought the patient appeared slightly icteric at the onset of illness. He did not recall having chills or fever. Systemic inventory revealed the gastro-intestinal symptoms mentioned along with nocturia of two times a night and exertional dyspnea.

Physical examination revealed the blood pressure to be 90/64. Multiple spider nevi were noted over face, neck, chest and upper extremities. The liver edge was firm and sharp and was felt below the level of the umbilicus. The spleen was not palpated. Dental sepsis was noted. The initial impression was hepatomegaly with hepatocellular insufficiency, probably infectious hepatitis.

The patient was hospitalized for study where the following laboratory data was obtained. Prothrombin time was 19.5 seconds or 27 per cent of normal. There was grade 4 albuminuria. Van den Bergh's test measured .9 mg. per cent. Total proteins measured 4.6 gm. with 3.3 gm. of albumin and 1.3 gm. of globulin, or an A/G of 2.6:1. The bromasulfalein tests revealed 30 per cent of the dye retained after 30 minutes. Red cells numbered 3.37 million, with 10.2 gm. hemoglobin; white cells were 15,030, with 46 per cent neutrophiles; 42, lymphocytes; 5, eosinophiles; and 6, monocytes. An x-ray film of the chest was interpreted as negative. The Mazzini test for syphilis was negative, as was the cephalin flocculation test. The BUN was 25.8 mg. per cent. The scout film of the abdomen was negative. The congo red test showed that 100 per cent of the dye disappeared in 60 minutes.

Outside films revealed the right kidney to be fairly well depicted and grossly negative. The left kidney was visualized fractionally. An irregularity of the sixth rib on the right was interpreted as an old fracture. Sternal marrow studies revealed a moderate degree of erythrocytic hyperplasia. Granulocytic series appeared essentially normal. An x-ray film of the stomach showed evidence of low-grade gastritis. There was no evidence of gastro-intestinal malignancy although the patient was too ill to cooperate for a refined examination.

The patient continued to have much night pain especially in the low back. Anorexia, vomiting and nausea continued. He was given two pints of blood. He became slightly confused. Dr. Borland, of our surgical staff, performed a needle biopsy of the liver which revealed deposition of amyloid. There was atrophy of hepatic cords. In most instances, the sinusoids were virtually closed due to the amyloid. No inflammatory reaction was seen. Pathological diagnosis: Amyloidosis of the liver. The patient lapsed into coma and died on March 12, 1949, twelve days after admission to the hospital.

Postmortem examination revealed 2,000 cc. of bloody ascitic fluid. The liver was extremely large and firm, weighing 3500 gm., and with a smooth, shiny surface. Cutting into the liver was like cutting into wax, and the cut surfaces were waxy in appearance. The spleen was large and firm, dark red in color, and weighed 375 gm. On cutting, it also looked and felt like wax. The application of iodine to the cut surface of both spleen and liver gave a mahogany-brown color. No amyloid was demonstrated in other organs.

Comment. This case is unusual because amyloid was deposited in the usual sites (liver and spleen) but there was no associated disease present. As far as we know there is only one previous case of primary amyloidosis with symptoms and signs of liver disease diagnosed by liver biopsy. This was reported by Wallalger[6] in 1950. This biopsy, however, was *not* obtained by needle technique, but tissue was procured through a small incision over the anterior surface of the liver.

We do not feel that intra-abdominal bleeding secondary to needle biopsy was a significant factor in this man's death. Volwiler[7] reported a fatality following "trocar" biopsy of the liver. His patient had a greatly enlarged amyloid liver. Autopsy two days after biopsy revealed a puncture wound in the right main hepatic vein. There was much intra-hepatic bleeding and apparently enough pressure had been built up to cause a huge laceration in the right lobe of the organ. Close examination of the liver in our case did not even disclose the puncture wound made by insertion of the Silverman needle. Using Lubarsch's classification this case would be classified as typical amyloidosis not associated with other disease. According to Whittlesey, it is a case of primary typical amyloidosis.

CONCLUSION

Two cases of unusual amyloidosis have been presented. As far as can be ascertained, the second case represents the first time primary amyloid disease with symptoms and signs of liver disease has been diagnosed by needle biopsy.

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1870

RHEUMATISM PRODUCED BY THE ADMINISTRATION OF LACTIC ACID

". . . The above record contains an account of the joint-symptoms which were observed in two cases to follow the administration of lactic acid. In the first case, at least six well marked arthritic attacks occurred; in the second case, under conditions less favorable for observation as to duration of treatment and place, one well marked attack occurred. The phenomena corresponded in all respects to those which are characteristic of acute articular rheumatism. They came on when the acid was taken, and ceased when it was discontinued. When moderate quantities of the acid were tolerated, an increase in the dose was succeeded by the painful inflammation of the joints. Coinciding with the development of the articular affection was the appearance of perspiration, at first only slight, but afterwards, in the more severe attacks, copious and acid."

—*British Medical Journal.* Reprinted in *Northwestern Medical & Surgical Journal* (The Journal-Lancet) 3:477-483, 1872.

Present Status of ACTH and Cortisone in Rheumatic Fever*

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Two years have passed since the original observations of Hench and his associates[1] were reported on the favorable effect of Compound E (cortisone) and pituitary adrenocorticotropic hormone (ACTH) on patients with rheumatoid arthritis. It was only a short time following this that Hench and his associates[2] also reported upon the use of these two hormones in the closely related disease, rheumatic fever. A number of other investigators[3-6] have likewise confirmed these initial observations and a review by Barnes[7] of the present status of ACTH and cortisone in rheumatic fever has recently appeared.

Most observers seem to agree with Barnes[7] that "the results of administering cortisone or ACTH to patients with acute rheumatic fever vary with the severity of the disease but especially according to how early in the course of rheumatic fever these hormones are given." The results, however, of administration of these hormones to patients chronically ill with rheumatic fever seem to be contradictory;[8] in general they have been much less striking.

EFFECTS OF THE HORMONES ON THE ACUTE DISEASE

As reported earlier,[9] if the hormones are given early in the acute attack, fever, polyarthritis, tachycardia, and general toxicity are abolished within one to three days. Following the administration of ACTH, the fever and polyarthritis usually disappear within four to 18 hours. The action of cortisone, however, is somewhat slower than that of ACTH as the temperature may not return to normal for two days and the polyarthritis may take three days to disappear.

With few exceptions, the acute carditis of rheumatic fever decreases in severity during the administration of ACTH and cortisone. This author has not seen any case in which the carditis progressed while the patient received either of the hormones and yet such occurred in the past in patients that received salicylates. A reduction of the carditis is evidenced by a decrease in the pulse rate, a return of the P-R interval of the electrocardiogram to normal, a decrease in the heart size, and a decrease or a disappearance of the heart murmur. In most of this author's patients, the heart murmur completely disappeared six weeks after the hormone was started.

Reappearance of the acute manifestation of the disease occurred in a high percentage of Barnes's[7] patients following withdrawal of the hormones. It was thus concluded that they were capable of suppressing but not curing the acute rheumatic fever. Massell and Warren,[10] on the other hand, expressed the belief that they cured the disease in some patients. Earlier work reported by us[6] would confirm Barnes's statement regarding inability of the hormones to *cure* rheumatic fever. Although the hormones caused an unexpected early drop in the sedimentation rate and the non-specific hyaluronidase inhibitor, the blood mucoproteins remained elevated during the natural course of the disease as though the patients had been untreated. A review of the first twenty patients treated by us with either of the hormones can be seen in table I.

Both ACTH and cortisone seem to have a marked effect on increasing the appetite. Some of the observed effect is undoubtedly due to a reduction of the toxicity of the patient. This, however, does not explain the entire effect, as the increase in caloric intake is occasionally greater than the anticipated normal consumption. Similar comments would apply to the improvement in the psyche accompanying ACTH or cortisone administration. Our patients were followed by members of our child psychiatry staff, as well, and no untoward effects of the hormones were observed.

The metabolic effects of ACTH and cortisone administration are now well recognized. They can produce: a retention of sodium, chloride, and water; an increased excretion of nitrogen, calcium, phosphate, potassium, and 17 ketosteroids; a decrease in the plasma gamma globulin and fibrinogen; and mobilization of fat stores for conversion to glucose. In the doses of the hormones used by us, we were not impressed by any extreme alteration in the body metabolism. No special medications or diets were given in anticipation of such alterations.

ADMINISTRATION OF THE HORMONES

It is the consensus of most observers that the patients should be given maximal amounts of the hormones initially and then taper the dosage off after one week to ten days, continuing administration in small amounts either daily or every other day for several weeks. In our studies, the initial dose of ACTH varied between 40 and 100 mg. per day depending upon the size of the child. This was given in divided amounts every four to six hours intramuscularly. Usually cortisone needed to be given in doses twice that of ACTH (i. e., 80 to 200 mg. per day) but administered only once or twice a day.

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TABLE I

CLINICAL DATA ON FIRST TWENTY PATIENTS TO RECEIVE ACTH OR CORTISONE

Name	Age	Sex	Duration Before Treatment	Length of Treatment	Maximum Daily Dose	Time for MPT.* to Normal	Time for Sed. Rate to Normal	Severity	Comments (Residual Trouble)
D.B.	3	F	37 days	41 days	50 mgs.	2 months	19 days	Moderate	No murmur
P.B.	13	F	20 days	46 days	80 mgs.	3 months	35 days	Moderate	No murmur, chorea later
C.D.	9	M	1 day	15 days	40 mgs.	2 months	10 days	Moderate	No murmur
P.D.	10	M	20 days	41 days	80 mgs.	2½ months (up at 25 days)	30 days	Moderate	No murmur
P.E.	11	M	7 days	19 days	100 mgs.	N - 10 months	14 days	Moderate	Apical systolic murmur present at disc, but disappeared
W.H.	15	M	21 days	15 days	100 mgs.	Still up 15 days	11 days	Moderate	Slight murmur
J.K.	8	M	3 days	25 days	60 mgs.	Normal 1 month later	10 days	Moderate	Previous murmur—no change,
G.L.	6	F	5 days	24 days	50 mgs.	Still up 24 days	17 days	Moderate	Sys. murmur present at discharge. No follow-up
J.L.	15	M	14 days	25 days	100 mgs.	Still up 6 months	24 days	Moderate	Previous murmur—no change,
R.O.	8	F	1 day	22 days	60 mgs.	Still up 22 days	9 days	Moderate	AI and MI at discharge. No follow-up
M.P.	13	F	3 days	31 days	80 mgs.	Still up 1 month	19 days	Moderate	No murmur
W.P.	9	M	2 days	39 days	80 mgs.	2 months	12 days	Severe	No murmur—diabetes
Y.P.	12	F	21 days	28 days	80 mgs.	3 months	23 days	Moderate	No murmur
D.S.	15	M	16 days	10 days	80 mgs.	Still up 2 months	8 days	Moderate	No murmur
E.W.	17	F	20 days	49 days	100 mgs.	Still up 9 months	19 days	Moderate	No murmur
L.Z.	4	M	7 days	32 days	80 mgs.	Still up 2 months	16 days	Moderate	Recurrent polyarthritis Possible rheumatoid
E.R.	14	F	4 years	70 days	50 mgs.	2 months	7 days	Severe	Rheumatoid arthritis
P.A.	9	M	2 years	31 days	80 mgs.	Normal at beginning	11 days	Mild	Rheumatoid arthritis
B.E.†	11	F	14 days	24 days	150 mgs.	Still up 4 months	19 days	Moderate	Syst. murmur at discharge, eventually disappeared.
L.F.†	6	F	2 days	19 days	100 mgs.	Still up 19 days	17 days	Moderate	No murmur

*MPT—is mucoprotein tyrosine

†Received cortisone

It should be emphasized that administration of neither hormone should be stopped suddenly. The place of oral cortisone in the treatment of acute rheumatic fever has not been determined, as yet, but it is probably wiser to administer the hormone parenterally during the early phase of treatment.

PROGNOSIS

It is still too early to evaluate the long term effects of these hormones in rheumatic fever. It has been the experience of most observers that they produce dramatic immediate effects but whether the late cardiac damage will eventually occur remains to be ascertained. Long term studies are now in progress throughout the country to study this and similar problems.

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Prolonged Labor*

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It is difficult to define prolonged labor because some patients deliver normally after periods of uterine contractions which last several days. On the other hand, normal labor terminates within a period of twenty-four hours in the majority of obstetric patients. Arbitrarily any labor lasting longer than twenty-four hours may be looked upon as an abnormally long labor.[1] When labor is prolonged, it is usually the first stage of labor that is abnormal. In the majority of patients the second stage of labor does not last longer than two hours. Calkins[2] has pointed out that the number of uterine contractions occurring during the second stage of labor is perhaps more important than the length of time which elapses. The normal second stage of labor has a duration of approximately ten uterine contractions. In those patients in whom more than twenty-five contractions occur during the second stage operative delivery is usually necessary.

One of the most difficult problems confronting the obstetrician is the decision that the patient actually is in labor. Failure to correctly interpret the character of painful uterine contractions has frequently led to unnecessary operative interference and has unquestionably increased the incidence of cesarean section. Differentiation between true and false labor pains is not always easy. It is well to remember that true labor pains inevitably produce effacement and dilatation of the cervix. Uterine contractions which do not result in a change in the cervix are usually false labor contractions.

A patient was recently sent to the Indiana University Medical Center for cesarean section following a period of painful uterine contractions which lasted 36 hours without progress taking place. This patient was a primigravida, and at the time of admission showed no effacement or dilatation of the cervix and the presenting part was, as yet, unengaged. Contractions were occurring at ten to fifteen minute intervals. She was extremely obese, weighed approximately 250 pounds, and our conservative attitude was reinforced by the technical difficulties of a cesarean section. Her pelvic measurements were normal and the fetus did not appear to be of unusual size. Following admission to the hospital, she was given 5 per cent dextrose in distilled water intravenously, and received one-quarter grain of morphine. Uterine contractions ceased during the eight to ten hours following this medication but recurred subsequently and no progress took place during the next twelve hours. A second rest period was given the patient and more intravenous fluids were administered. After this second rest period, uterine contractions recurred and interestingly the patient herself volunteered the information that these contractions felt different from the preceding ones. They were, and within a period of ten hours the patient reached complete cervical dilatation, the head approached the perineum and she was delivered without difficulty. In actual fact, she had a labor lasting ten hours with approximately 48 hours of false labor pains preceding the actual onset of labor. This brief clinical report emphasizes the importance of carefully evaluating uterine contractions and of the proper appreciation of frequently encountered false labor pains.

The outcome of any labor represents a process of accommodation between the fetus and the birth canal. In all instances sufficiently powerful, normally occurring uterine contractions are essential for the progress of the infant through the birth canal. The proper evaluation of as many of these factors as possible during the antepartum period or at the onset of labor is essential.

Mensuration of the pelvis either clinically or roentgenographically or both is an essential portion of the evaluation of the obstetric patient. For practical purposes, careful pelvic examination with an estimate of the diagonal conjugate diameter, the prominence of the ischial spines, and accurate measurement of the pelvic outlet is sufficient. If any of these measurements are in question supplementary x-ray examination should be obtained and correlated with the clinical findings. It is rare for sufficient contraction of the pelvis to be encountered in the absence of gross deformity to justify elective cesarean section (Dieckmann[3]).

In evaluating x-ray measurements of the pelvis it has been our policy to follow the criteria suggested by Mengert.[4] He points out that significant contraction of the pelvic outlet never occurs without coincident contraction of the midpelvic plane. For a practical evaluation of the x-ray measurements of the pelvis, the information obtained from the product of the anteroposterior and transverse diameters of the pelvic inlet and of the midpelvic plane is essential. The product of these diameters averages 145 for the pelvic inlet and 125 for the midpelvic plane. Measurements which give a product less than 85 per cent of this figure justify consideration of cesarean section as the procedure of choice and in most instances warrant a very careful trial of labor.

The presentation, position and the size of the infant are additional data which one must have. Presentation and position can be determined either clinically or by x-ray examination with sufficient accuracy to justify evaluation. The occurrence of a breech presentation and the associated greater fetal mortality in such circumstances will in many instances indicate a more radical approach

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than would be warranted in the presence of a cephalic presentation. Even extensive clinical experience results in inaccurate guesses concerning fetal size and this fact should be recognized in evaluating the course of labor.

Experience indicates that there is no such thing as an undilatable cervix in the absence of previous cervical disease with a history of extensive cauterization, conization or amputation of the cervix. Cervical dystocia is therefore extremely rare and when apparent, is in most instances due to faulty uterine contractions.

For most patients whose labor is protracted, faulty uterine action is the underlying factor. The studies of Reynolds[5] and his group using the tocodynamometer have demonstrated this fact. During normal labor the greatest gradient of contraction is in the uterine corpus with the cervix remaining passive and progressive contractions extending from the fundus of the uterus throughout the corpus. A tense or spastic cervix frequently interferes with the progress of labor and one of the important factors contributing to this situation is the combination of fear, anxiety, and tension. This rather than the emphasis on natural childbirth represents the important contribution of Read[6] to modern obstetrics. Primary uterine inertia or failure of effective contractions from the onset of labor does occur but much more frequently secondary uterine inertia is encountered. The recognition of the beginning development of poor uterine contractions and preventive rest for the patient and her uterus is an important factor in the control of prolonged labor. Adequate analgesia in the apprehensive or unconsciously tense patient frequently results in effective uterine action and the normal progress of labor.

Artificial stimulation of the uterus to increased muscular activity is potentially dangerous and requires not only careful evaluation of the factors responsible for delay, but good obstetric judgment and close observation of the patient. The administration of pituitrin or other oxytocic drugs in isolated dosage, no matter how small, is unquestionably dangerous. Hellman[7] has shown that the most nearly physiologic increase in uterine activity can be produced by the administration of pitocin by continuous intravenous drip. The use of 1 cc. of pitocin in 1500 cc. of 5 per cent dextrose in distilled water is recommended. The initial dose should not be more than 50 cc. in one-half hour and may subsequently be increased to 100 cc. in half hour periods. Even this method of administration may produce abnormal uterine contractions, tetany of the uterus, or rupture of the uterus and necessitates continuous careful observation of the patient with immediate cessation of the medication if the uterine contractions are in any way abnormal. Careful evaluation of the pelvic size and relative cephalopelvic disproportion is essential before considering such treatment.

No patient should be allowed to continue labor for longer than 12 hours without making progress in dilatation and effacement of the cervix and descent of the presenting part without careful sterile vaginal examination being performed to determine the situation which is present. In patients with a borderline pelvis or with suggestive disproportion between the size of the fetus and birth canal a trial of labor is much preferred to a test of labor. One can more satisfactorily insure the survival of the baby and the absence of damage to the mother if he does not insist upon complete cervical dilatation with the membranes ruptured for two to three hours before deciding that delivery vaginally is impractical.[8] In most instances, a decision can be made before this state has been reached by evaluating the character of the uterine contraction, the absence of apparent disproportion and the progress of cervical effacement and dilatation. It is wiser to reach a decision before the second stage of labor has been reached. Rupture of the membranes either spontaneously or artificially before complete dilatation of the cervix but after definite effacement and dilatation of the cervix has occurred increases the accuracy of this evaluation.[9] In modern obstetrics cesarean section is a sufficiently safe method of delivery to justify occasional errors in judgment.[10]

Where membranes rupture prematurely, or are artificially ruptured during the course of labor that is not associated with entirely normal progress, the patient and her infant should be protected by the prophylactic administration of antibiotics. Douglas[11] suggests the combination of penicillin and sulfadiazine. Four hundred thousand units of penicillin every twelve hours should be the minimum amount administered.

Supportive treatment in the form of adequate periods of rest and nourishment by intravenous fluids are an important part of the management for any patient who is not progressing satisfactorily in labor. This should not be delayed until exhaustion is apparent but should be anticipated. Allowing labor to continue beyond a period of 30 hours is associated with an increased risk for the infant as the result of increased intracranial pressure, anoxia, and potential intrauterine infection.[12] Prolongation of labor is also associated with an increased incidence of difficult operative procedures either vaginally or abdominally which increases the risk for the patient.

Any patient who has experienced a prolonged labor should be carefully watched during the third stage of labor, as postpartum hemorrhage due to uterine atomy and failure of a normal mechanism for the third stage is increased. Extreme care in the management of the third stage is indicated and blood should be available for transfusion if indicated. Prophylactic administration of antibiotics to both mother and baby, if this has not been done during labor, is justified.

Under no circumstances should attempts be made to deliver such patients through an incompletely dilated cervix. Premature interference and attempted delivery before the birth canal is prepared represent a very great hazard for such individuals. Where vaginal delivery is indicated in the presence of an incompletely dilated cervix, and this is rarely, cervical incisions as described by Dührssen are preferable to any form of accouchment force or manual dilatation of the cervix.[13] While cesarean section is a relatively safe procedure, it is not

(Continued on page 46)

Medical Management of Bilateral Adrenalectomized Patients

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SURGERY of the human adrenal glands, although of recent development, is now in a fast moving, evolutionary stage. Hitherto, most of the procedures on the gland were undertaken to correct pathological conditions, the majority of which were tumors. Charles H. Mayo in 1927 reported the first case of successful removal of pheochromocytoma. The complete removal of one or both of the glands for hypertension is now more or less in the early experimental stage—not experimental from the surgical technicalities involved but in regard to its value in the treatment of hypertension.

The adrenal glands are essential to life and their removal cannot be undertaken lightly. The physiology of the gland has been known for a long time but more precise knowledge has been uncovered in the last few years. The isolation and preparation of compound F and cortisone by Kendell and his coworkers have given impetus to these studies.

By way of brief review, the gland is composed of two separate and distinct types of tissue, having entirely different functions. The adrenal cortex is formed from the mesodermal cells of the wolffian body near the genital ridge. These grow out and encase cells of the sympathetic nervous system derived from the ectoderm. The medullary portion of the gland is formed from the cells of the sympathetic nervous system.

The medullary portion is concerned chiefly with the production of adrenalin hormones of two types: epinephrin and norepinephrin, both of which cause elevation of the systolic blood pressure. In addition, epinephrin causes little change in the diastolic pressure, a decreased peripheral resistance, increased cardiac output and tachycardia. Norepinephrin causes elevation of the diastolic pressure, increases peripheral resistance and produces bradycardia.

The normal adrenal cortex is rich in ascorbic acid and in lipids including cholesterol and other steroids of which many have been isolated. Of greatest significance in cortical hyperfunction is the elaboration of androgens, estrogens, and corticoids including the eleven oxygenated steroids, such as cortisone and 17-hydroxycorticosterone. The physiology of the adrenal cortex is intimately concerned with electrolyte metabolism, carbohydrate metabolism, renal function, growth of young animals, resistance to stress, relation to blood pressure, and muscular response.

It is at once apparent that interference of adrenal activity will result, if untreated, in an alteration of numerous vital chemical and physiological processes in the human body. Among these are (1) a fall in blood pressure, (2) serious reduction in the sodium ion concentration of the plasma, and (3) less decrease in the chloride ions. Along with the two latter changes there is a rise in plasma potassium and magnesium concentrations. We are all aware of the serious clinical entities associated with altered plasma potassium concentration. Then there is also an excretion of 6.5 cc. of water with the excretion of each milliequivalent of sodium and (5) marked disturbance in renal function. This results in dehydration, reduction in blood volume, fall in blood pressure, and a rise in non-protein nitrogen. Finally, there is (6) disturbance in sugar metabolism resulting in low blood sugars, and depleted glycogen reserve.

In addition, there is a marked effect on the functions of practically all of the other glands of internal secretion. Thus, we can see the possible wide range of pathological disturbances that may result from removal of the glands. However, equipped with knowledge of these changes and with the facilities to meet them, we are able to venture into the realm of adrenal surgery. Teamwork between the surgeon and internist is paramount, and the services of an accurate laboratory are essential.

The physical as well as the chemical status of the patient must be followed closely in the postoperative period. It is also well to remember that the patient suffers from hypertension and possibly the complications of that disease. These must be scrutinized closely, corrected where possible, and always borne in mind in the postoperative period. Among findings that must be observed closely are blood pressure, fluid balance, blood volume, blood sugar, serum sodium, serum potassium, CO_2-combining power and cardiac and renal functions. Abnormalities in any of these must be promptly treated.

The removal of both adrenal glands necessitates treatment for an acute adrenal crisis. This crisis may develop as a consequence of increased need of hormone during the stress of surgery and must be prepared for with prophylactic therapy. When so employed, a fairly smooth safe course may be expected, but to wait until the crisis develops invites disaster. Specifically, we aim to maintain a high concentration of hormone throughout the operation and to prevent development of shock by use of large amounts of water-soluble whole extract, whole blood, plasma, or albumin. Thorn[1] employed a schedule as follows:

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1. For twenty-four hours before the operation, the patient is given 5 cc. of aqueous adrenal cortical extract every four hours, or 1 cc. of lipo-adrenal cortex every eight hours, and a single dose of 10 mg. of desoxycorticosterone acetate in oil.

2. On the morning of the operation, the patient is given an infusion of 500 cc. of 10 per cent glucose and saline to which is added 25 cc. of aqueous adrenal extract. This infusion is timed so as to be completed at about the time the anesthesia is started. This is followed by a continuous infusion of 10 per cent glucose and 10 cc. of aqueous adrenal cortical extract per 100 cc. of the glucose solution, to which is added one or two units of plasma. A marked decrease in blood pressure should be countered immediately by the rapid administration of plasma or whole blood if there has been an appreciable blood loss. Epinephrin in small doses may be given to counteract a sudden decrease in pressure.

3. Morphine and avertin should not be used. In general, the dosage of any drug used postoperatively should never exceed one-half the usual amount and all such therapy should be given thoughtful consideration. This refers, of course, to sedation and hypnotics.

Huggins and Bergenstal[2] employ the following routine:

For the twenty-four hours preceding the operation, they give:

(a) Cortisone acetate, 50 mg. at 6:00 A.M., 12:00 noon, 6:00 P.M., and 12:00 midnight.
(b) Doca 5 mg. at 6:00 A.M.
(c) Sodium chloride 5 gm. orally at 6:00 P.M.

On the day of operation, they give:

(a) Cortisone acetate 150 mg. at 7:00 A.M.
(b) Doca 5 mg. at 7:00 A.M.

The operation is performed at 8:00 A.M.

(a) Cortisone acetate 50 mg. every four hours.

On the day after operation, they give:

(a) Cortisone acetate 50 mg. every six hours.
(b) Doca 5 mg., one injection.
(c) Sodium chloride 3 gm. by mouth.

On the second day after operation, they give:

(a) Cortisone acetate 50 mg. every twelve hours.
(b) Doca 0-3 mg. as needed.
(c) Sodium chloride 3 gm.

Subsequent days: Gradually reduce cortisone acetate until a sustaining dose of 25 to 50 mg. daily is reached. This is usually about one week after the operation. Doca is not needed for a maintenance dose. Cortisone acetate and doca are given intramuscularly and sodium chloride is given by mouth. Five hundred cubic centimeters of 0.9 per cent sodium chloride and 500 cc. of plasma are injected intravenously during the operation and epinephrin is injected when the systolic blood pressure falls below 100 mm. of mercury.

Blood must be available at the time of surgery to replace that lost. Huggins and his coworkers feel that massive infusions of fluid are harmful, and believe that not over 1500 cc. should be given. Edema formation and elevation of blood pressure above normal contraindicate salt therapy. Six-tenths grams of acetylsalicylic acid is given when the temperature is 38° centigrade or higher. In the leveling-off period, the patient usually supplements his dietary sodium with 2 to 4 gm. of sodium chloride daily. If possible, daily sodium, potassium, hematocrits, blood sugar, and blood urea nitrogen tests would be very helpful in following the metabolic reactions after surgery as well as serving as invaluable guides to therapy. It should be stressed again that accuracy in these laboratory studies is essential for erroneous results are worse than no tests at all. Sodium and potassium determinations by the usual chemical methods are tedious, laborious, and fraught with error. I, personally, would feel safe only if these tests were made using the flame photometer.

TABLE I

NORMAL VALUES FOR CERTAIN BLOOD CONSTITUENTS

Hematocrit—male 45 per cent, female 43 per cent.
Blood urea nitrogen—10 to 15 mg. per 100 cc.
Non-protein nitrogen—20 to 40 mg. per 100 cc.
Fasting blood sugar (true value)—80 to 100 mg. per 100 cc.
Serum sodium—330 mg. per 100 cc. or 142 milliequivalents per liter. Conversion factor (0.431).
Serum chloride—370 mg. per 100 cc. or 105 milliequivalents per liter. Conversion factor (0.284).
Serum carbon dioxide-combining power—60 vol. per cent or 27 milliequivalents per liter. Conversion factor (0.45).
Serum potassium—18 mg. per 100 cc. or 4.5 milliequivalents per liter. Conversion factor (0.25).
Serum calcium—10 mg. per 100 cc. or 5 milliequivalents per liter. Conversion factor (0.50).
Serum phosphorus—3.7 mg. per 100 cc. or 1.2 milliequivalents per liter. Conversion factor (0.324).
Alkaline phosphatase—2 to 4 Bodansky units.

It is evident that a patient who has had complete bilateral adrenalectomy, is faced with a permanent state of chronic adrenal insufficiency. He will then require permanent replacement therapy and must be kept under permanent medical supervision. It would be well to educate this patient concerning the nature of his disability, the danger signs of impending adrenal insufficiency, and the need of continued cooperation with his physician. The treatment of chronic adrenal insufficiency is now going through a phase of evolution, and simpler and safer methods of therapy are being evolved. This new procedure for the treatment of hypertension will bear close and critical observation.

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An Auditory Projection Technique for Psychiatric Research*

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MANY visual perception techniques, including the well-known Rorschach test, have been utilized by psychologists and psychiatrists[1] in the hope of obtaining responses which will give the tester insight into the personality structure, or suggest the psychiatric diagnosis. Other sensory tests involving touch and odor have been described. Considering the importance of normal auditory phenomena it is strange that the field of sound association has been so little explored, although a few attempts have been made.

Skinner[2] induced a recording device for repeating samples of speech such as "ah-uh-uh-oo-uh" for the study of latent speech and projection.[3] Called the "tautophone", it was found to have limited value and has not been widely used. Stone[4] described an "auditory apperception test" used to elicit responses in story form similar to the Thematic Apperception Test.[5] Three sounds are used in each of ten sound situations. There are ten records consisting of various combinations of nonverbal human sounds, music, dramatic episodes, simple dialog, crowd sounds, animal sounds, sounds from nature and mechanical sounds. The details of the test and evaluation of responses did not appear in the initial paper.[4]

The need for a clinically useful sound association technique seemed clear. Such a technique may be of value for patients whose visual responses are not rich, for the blind, for children and also to complement, supplement, validate or at times replace visual tests.

We arranged, accordingly, a series of recordings of 75 isolated sounds and presented them to 117 subjects with the object of selecting a final sound association record of 21 sounds for clinical use. There are, in general, two types of sounds: the structured, such as an angry dialog, and the unstructured, such as sucking sounds.

METHOD

Three sound test sets were made.

Record 1:

1. Phone ringing continuously for 75 seconds.
2. Crowd noise of a mixed group of men and women, 65 seconds.
3. Steps and a scream; 22 steps and a woman's scream, 30 seconds.
4. Water dropping into water. 75 seconds.
5. Clock ticking. 75 seconds.
6. Thirteen steps—door opened—2 steps, door closed—8 steps. 25 seconds.
7. Organ music. 70 seconds.
8. Sound of a car running (10 seconds) and the sound of screeching brakes. 15 seconds.
9. A man and a woman counting from 1 to 10, their voices diminishing in loudness as the number approaches 10. 20 seconds.
10. Tearing a heavy piece of cloth. 15 seconds.
11. A woman sobbing, 35 seconds.
12. Writing with a very scratchy pen. 50 seconds.
13. Good typist typing for 50 seconds.
14. The sound of young children playing. 50 seconds.
15. Four consecutive sneezes. 15 seconds.

Record 2 (each sound lasts 30 seconds):

1. *Train*: Recorded on railroad station platform.
2. *Baby's cry*: Three-day-old baby in pain.
3. *Argument*: Man and wife arguing about "something".
4. *Music*: "Boogie-woogie" piano.
5. *"Can I have one?"*: Plaintive repetitious sequence of children's voices with music background.
6. *Sirens*: Factory siren.
7. *Happiness*: Radio recording of minister preaching on subject of "happiness".
8. *Cry for help*: Man calls as if in great distress, "help" sounds fading away.
9. *Music*: Circus march.
10. *Noises*: Big city, garage noises; newsboy crying "extra".
11. *Footsteps and door closing*: Slow steps, then hurried and frantic, then sound of closing door.
12. *Radio program*: Music interrupted by special incomplete announcement.
13. *Bells*: Wedding bells.
14. *Scolding*: Child being scolded and then crying.
15. *Music*: Zither music.
16. *Sounds*: Radio signal, fire or police siren, train wheels, car and newsboy crying "extra".
17. *Conversation piece*: First the sound of wind and rain, followed by voices in incomplete conversation.
18. *Laughter*: Followed by two voices in conversation with some words left out.
19. *Baby-mother sequence*: Baby in bed cries, mother comes and sings to child.
20. *Applause*: Followed by introduction to speech.

Record 3 (each sound lasts 30 seconds):

1. *Music*: Church music. Voices singing "Holy, holy, holy."
2. *Noises*: Grating, rubbing noise.
3. *Water*: Stream of water diminishing to dripping sound.
4. *Noises*: Hands being rubbed together.
5. *Water*: Water running in the sink.
6. *Crowd*: Mob yelling, approximating 3,000 people.
7. *Clapping*: Three pairs of hands in slow cadence clapping.
8. *Cry*: The cry of a 3-day-old nursing infant.
9. *Cry*: 10-month-old infant crying in anger and hurt.

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10. *Cry*: 3-year-old child crying.
11. *Cry*: Sound of a wild bird.
12. *Cry*: Male adult crying.
13. *Cry*: Adult woman crying.
14. *Noises*: Sucking noises.
15. *Drums*: Rhythmic, primitive beat of jungle drums.
16. *Gong*: Sound of Burmese gong.
17. *Motor*: Sound of idling automobile and/or power-boat motor.
18. *Ocean Sounds*: Sound of waves breaking and seagulls in flight.
19. *Noises*: Man grunting and groaning.
20. *Noises*: Echoing sounds, clatter of instruments and indistinct accompanying voices, hospital operating room.
21. *Music*: Brahms' Third Symphony, portion of Fourth Movement.

All sounds were recorded in studios on standard discs. Some had previously been obtained on a portable recording machine at the hospital (newborn cry, nursing sounds, etc.) and in the home (children crying, pleading, etc.); studio sound effect records were also used (crowd of 3,000 people yelling, sound of a wild bird, etc.). These were to be preliminary runs and it was recognized that more suitable and original sounds would be needed for the final selection. The particular sequence of the sounds was set arbitrarily, but careful attention was given to responses which might give meaning to sequences, desirable or undesirable.

Subjects were given only one of the three records. In the case of the first record the tester (M.A.H.) explained the nature of the test and sample responses. Instructions were recorded at the start of records 2 and 3, as follows: "You are now going to hear a series of recorded sounds. Some of these will be familiar, some strange. All sounds have associations—they bring memories, thoughts or feelings to mind. This is true of music, cries, words, etc. You will hear 30-second sequences of sounds. Sounds have different meanings to different people. We are interested only in the meaning these sounds have for you. Tell me what your first thought is—what comes to your mind—what do the sounds tell you. If you wish, make up a story. Are you ready? Now, what does the sound say to you?"

The tester wrote the responses in the presence of the subject or recorded them on a recording machine. All sounds were analyzed for the particular quality of provoking varied and multiple responses or significant rejections. Responses of each subject were tabulated and compared, and the responses to each sound also were tabulated and compared.

RESULTS

Sounds were first compared by tabulating number of responses to each of 20 types of projection:

1. *Definite association*:
   "That is a . . . "
   "This is an angry parent and a child"
2. *Multiple associations*:
   "At first . . . then . . . "
   "Could be this, could be that"
   "Baby crying or hungry, or a barking dog"
3. *Hearing*:
   "I first heard a woman's voice"
   "I did not hear what he said"
   "As if you are listening to . . . "
4. *Emotions in words*:
   "Melodramatic a woman who is scared—terribly"
   "Baby crying, very frightened"
   "Woman in pain, sobbing, calling for help"
5. *People in ambiguous situations*:
   "People in large building, factory or maybe airplane"
   "Sucking on something, shall we say"
   "Building tumbling, people crushed, some are lost"
6. *People without identity*:
   "Crowd yelling"
   "Bunch of people going boo, boo"
   "A group of people in a crowded station"
7. *Dissociation*:
   Baby crying becomes "animal or woman screaming" or "haunted house"
   Man crying for help becomes "woman laughing"
   For happiness sermon: "Someone talking in German"
8. *Guarded, uncertain, stalling*:
   "At first I thought I heard . . . "
   "It seems to be a . . . "
   "Well — let's see . . . "
   "Trying to think"
   "Not sure, sorta like"
9. *Human and/or animal and/or mechanical*:
   "Garage noises; woman came in with a dog barking"
   "Record running down; somebody screaming in distress"
   "Auto factory or dog kennels"
10. *Simple sound description*:
    "Baby crying"
    "Train moving"
    "Baseball game"
11. *Denial, rejection, sex change*:
    "It's a bad — no, it sounds like a baby crying"
    "I couldn't get a thing out of this"
    "That's nothing — could be a train"
12. *Qualified association*:
    "Might be a radio that isn't tuned right"
    "That reminds me of trying to . . . "
    "Can't decide whether it's a dogfight or a baby crying"
13. *Direct personal association*:
    "Reminds me of the time I . . . "
    "Not the place I'd go dancing"
    "When I went to visit my daughter"
14. *Thinking*:
    "I thought I heard . . . "
    "It makes me think of . . . "
    "First I thought it was . . . and then I thought . . . "
15. *Emotional reaction in reality*:
    "I can't stand that sound"
    (Subject laughing or coughing): "Can we take a few minutes off?"
16. *People in definite situations*:
    "Two people arguing about the cost of . . . "
    "Newborn baby crying — doctor severed the cord"
17. *Very real, very vivid*:
    "Ambulance — a terrible accident"
    "Car on fire, burning fiercely"
18. *Storylike, fantasy, daydream*:
    "Going under anesthetic"
    "Weird ghost stories"
    "Movie background music, like Snake Pit"
19. *Objective, distant description*:
    "Hungry baby crying"
    "Sounds like some colored woman was talking to young fellow throwing dice"

20. *Conflict suggesting:*
    Dependency — independency
    Self-love — object-love
    Aggression — non-aggression
    Masculinity — femininity
    Sadism — masochism

These were ranked according to number of responses. The group was then divided into thirds: Group I included those with the least number of responses; Group III those with most responses (table I). It was considered desirable that a sound stimulate a high incidence of one type and a low incidence of another type of response, in order to delineate normal patterns. Next, the content was analyzed. Responses were studied to see if it were possible to predict anxiety, depression, preoccupations, suspiciousness, psychosis, etc.

CONTROLS AND PSYCHIATRIC PATIENTS

Tabulation and comparison were made for responses to Records 2 and 3 of 15 psychiatric patients and 65 control adults. A much larger series of adult controls is needed so that some fair predictability of response can be ascertained. Since the group of normal responses is small and many of the sounds will not be utilized in the final test, these will not be reported in this paper.

A partial analysis of patient responses was made, using the small group of normal tests for reference. Two of these analyses will be given:

Case Report:

Patient 1. A 28-year-old woman consulted the psychiatrist (H.A.W.) because of "nervousness and sleeplessness" of six months' duration. She showed considerable flattening of affect, and withdrawal from all outside contacts. She had "spells" of feeling unreal, fading away, and inappropriate and uncontrollable crying. There were ideas of reference, but no delusions or hallucinations. The diagnosis of early schizophrenia was made. Rorschach evaluation: "This protocol contains indications of the presence of an early schizophrenic process: (1) There is pathological overconcern with details, with some presence of thinking and content disorders. (2) The affect is quite withdrawn, and the few emotional contacts with the world are explosive and uncontrolled. (3) The patient's general level of aspiration is low, and this finds expression in minimal social interactions. (4) Although her reality-testing mechanism or ego is still operating, the element of fantasy is very strong. The result is visible psychic impoverishment. (5) She is overtly worried about a profound change taking place, which she feels powerless to avoid. (6) In general, she finds the world hostile and frightening. *Suggested diagnosis*: Schizophrenia, early, with depressive features. Her responses to Record 2 are as follows:

1. A. I know what you want me to do. That was a train and I didn't like it at all.
   Q. Why didn't you like it?

Table I.*

	Sounds											
Response Classification	Baby–Mother	Rain, wind, conversation	Scolding, crying	Footsteps, door	Garage noises	Cry for help	Happiness	Argument	Laughter, voices	Can I have one?	Baby crying	Train
1. Definite association	III	II	II	II	III	II	II	III	III	I	III	III
2. Multiple association	II	II	I	II	II	III	II	II	II	II	III	III
3. Hearing	III	III	III	III	III	III	II	III	II	III	III	III
4. Emotions in words	III	II	III	II	II	III	I	II	III	III	II	II
5. People in ambig. situations	II	III	III	III	III	III	III	III	II	III	III	II
6. People without identity	II	II	II	III	III	III	III	II	III	III	II	III
7. Dissociation	II	I	II	III	III	II	III	III	I	III	II	II
8. Guarded	I	II	I	II	I	I	II	II	II	II	I	I
9. Human, and/or animal, mechan.	II	III	I	III	I	I	I	I	I	I	I	III
10. Simple sound description	I	I	I	I	I	I	I	I	I	I	I	I
11. Rejection, denial	III	III	III	III	III	II	III	III	II	III	II	II
12. Qualified association	II	II	II	II	II	II	II	II	I	II	I	II
13. Direct personal association	I	I	I	I	I	I	I	I	II	I	I	II
14. Thinking	I	I	I	I	I	I	I	I	I	II	I	I
15. Emotions in reality	I	I	I	I	I	I	I	I	I	I	I	I
16. People in definite situations	II	II	II	I	II	II	II	II	III	I	II	I
17. Very real, very vivid	I	I	II	I	II	II	I	I	II	I	II	I
18. Phantasy	I	I	I	I	I	I	II	I	I	II	II	II
19. Objective	III	III	III	II	II	III	III	III	III	II	III	I
20. Conflict	III	III	III	II	II	III	III	III	III	II	III	III

*Sounds ranked according to quantity of responses — units of thought stimulated. They are of First, Second or Third rank, according to arbitrary division of responses into thirds.

A. It just makes my ears shriek—it didn't make my ears shriek, the sound makes my ears ring—it just goes against me. I don't think there is anything else.
Well, it's just that I've always liked trains. I mean it gives you the feeling that you're going some place.

2. A. That was a baby crying and I liked the sound of that. It reminds me of my own children—well, it didn't go against me at all.
Q. Why was the baby crying?
A. Well, because it was unhappy.
Q. Why didn't it make you unhappy?
A. Well, I don't know.

3. A. That just sounds like home. It makes me laugh because it was such a common occurrence.
Q. What was a common occurrence? What was happening?
A. Well, the mother was getting after the child—not that my mother always got after us, but it reminded me of noise and confusion at home and I like it.
Q. At your home when you were a child?
A. Yes.
Q. Why did you like it?
A. Well, it just was there and when I left it I sort of missed it because there were so many of us and we did have a lot of fun.
Q. Was there any argument?
A. You mean on the record? Yes.
Q. What did the voices say?
A. I didn't listen to the voices.
Q. Why not?
A. Well, I don't know why I didn't.

4. A. Well, that was jazz. I don't care much for jazz, and yet it didn't bother me at all. I enjoy that as much as I do the other, in a way.

5. A. I don't have any idea. I heard laughing and just noise.

6. A. That disturbs me. I don't know why—if it's associated with anything at all, but it just seems as though it's something horrible that's happening.
Q. For example, what is happening?
A. Oh nothing. An ambulance in there, being very sick, or a bad fire.
Q. What sort of sickness?
A. Just anything. It could be anything—a broken leg—it just seems as though—it's very frightening to me, and I think it always has been.

7. A. That was a man talking about how to obtain happiness in life. I didn't get too much what he said. I do know he was talking about that.
Q. What did he think about happiness?
A. Well, I guess this is the way I had it figured out. You just can't be happy unless you're doing things in life, being active and taking care of your home and your family, and if you aren't able to do those things, why I believe it makes you very unhappy.

8. A. That was someone crying for help and that immediately frightens me. I think the reason for that is that when I was in labor with the children I would hear these other women screaming and crying and it just—well, during my first labor I thought they must be dying, or, why doesn't somebody help them, and then when I had the second baby I realized different. It just seemed to me that it was so horrible.
Q. Was it a man or a woman?
A. That was a man.
Q. Why was he crying for help?
A. Well, I didn't hear what he said, I just heard him crying for help.
Q. Why do you think he was?
A. Well, it seemed to me he must be in terrible pain or practically dying or something.

9. A. Band and I'm not too fond of it; I like it and I will listen to it.
Q. Where was the band?
A. Well, it could have been playing in a park.
Q. Do you remember listening to a band playing in a park?
A. Yes, it was back home. We had a large city park and the band was playing. Well, I don't care for band music but I listen to it anyway. Well, to me it isn't anything very pretty.

10. A. I got nothing out of that at all—it was just noise.
Q. Where was the noise recorded?
A. Well, on second thought it could have been noise from a baseball game.
Q. Do you go to baseball games?
A. No.

11. A. That sounds very much like traffic—and it doesn't make me think of anything. Reminds me very much of the train when that was first illustrated—it was much louder and much shriller. The loud noises just seem to irritate me.
Q. Did you hear any voices?
A. Yes, there were several.

12. A. Yes, there is someone talking—he's closing the program.
Q. What's he say?
A. I didn't listen to what he was saying.
Q. Why not?
A. I don't know—I just had a feeling that it was over.

13. That was bells ringing, probably in a church tower. Brings nothing to mind at all.
Q. The bells don't have any association?
A. No, they don't. I'm not too fond of them. Sometimes they become shrill.

14. A. That was a child crying, screaming, and there was a man talking to it first—but I didn't get anything out of what he had said or what the child was crying for.
Q. What do you think he had said? Why do you think the child was crying?
A. Well, it could have been something bad. Oh, just anything. Well, it seemed to me it was an aunt.
Q. Not father?
A. Well, it would be father, I imagine.
Q. What did he (sic) say?
A. Well, I don't know.

15. A. That was Hawaiian music and it's very pretty music. I always liked it. The reason I have liked it was it was soft and quite soothing.

16. A. That sounded very much like a police car chasing someone and it has a frightening feeling and I believe that comes from listening to radio programs—FBI programs, things like that.
Q. Can you make a story up?
A. No, I don't think so. They'd broken the law.
Q. Was he going to catch them?
A. (Laughing) I suppose I should say something different.
Q. Why? Why should you say something different?
A. Well, I don't know. It just seemed so funny to me for a minute.
Q. What?
A. Well, I just had the feeling I should be more serious and I wanted to be funny.

17. A. That was a child crying. The baby could have been hungry. The only time a baby's voice annoys me is when it becomes too shrill.
Q. Did that annoy you?
A. When it got too loud it did.
Q. How did you feel?
A. Well, just as though it should stop right now.

18. A. That sounded like someone just told a joke and they were all laughing and yet the one particular person didn't think it was so funny. In a way it reminds

me of me. I was always sort of afraid to laugh at jokes because—well, if it was a real raw joke I didn't want people to think I was a little on the risqué side, and if it was an extremely silly joke I didn't want them to think that I was extremely silly by laughing at it. And I think that sound is always more serious and yet possibly on the inside I would just have loved to have been the opposite.

Q What about this fellow who walked—what did he say?

A He said he didn't think it was very funny. He got nothing out of the joke.

Q Why didn't he?

A Well, one reason could be that possibly he just didn't want to get anything out of a joke and yet you have to be yourself. If you didn't feel like laughing, why there's no sense in laughing.

19 A Well, that seemed like there were two or three different things. A baby crying and noise, but when I hear a baby crying it makes me feel as though something was going to happen. Something terrible, for no reason at all.

Q Like what?

A Oh, I don't know.

20 A Well, that was a man talking—and sounded like a train off in the distance. He was saying that he shouldn't be saying this.

Q To whom do you think he was talking?

A Well, he could have been talking to his wife or his family.

21 A That was someone at a baseball game, an announcer and the crowd was screaming and I guess that's all.

Q. What had happened?

A Well, I didn't listen to that!

Q. Do you know what names were said?

A No.

This is an early protocol in which direct questioning was used. Occasionally the questions were leading. Now we no longer ask questions until the end of the protocol except occasionally to repeat the patients' words if elaboration is desired.

Dr. G. Hamilton Crook, psychologist at Langley Porter Clinic in San Francisco, made this suggestive interpretation of the foregoing:

"Diagnostic impression: Hysteria (or possible hysterical character) with schizoid characteristics. This record conveys the impression that the patient is very self centered, very unperceptive of the wishes and needs of others, and that she characteristically ignores or runs away from unpleasantness (especially unpleasantness associated with guilt. Nos. 2, 3, 5, 12, "I didn't listen to the voices"). She seems too selfish to help others but feels guilty for not doing so. She seems to have a strong dependency wish but inability to accept a dependency status; and perhaps related to this, marked conflict between conformity and rebellious impulses (the conformity wish uppermost, the rebellion pattern deeper lying and largely repressed). Accompanying this, there appears to be a great deal of repressed guilt and hostility toward men. She seems suggestible, inconsistent (without realizing it) and to care more for the appearance of things than the reality. The schizoid elements in the personality seem to be evidenced primarily by inappropriate and excessively labile affect, as in responses 2, 3, 4, 16, 17, etc. Recurrent themes of interest are her repeated admissions that she was not listening to or did not hear the voices (six times) and her several references to her dislike for loud, shrill sounds (five times). Of particular interest to investigate further would be the trains of association aroused in responses 2, 3, 7, 8, 14, 16, 17, 18, 21, etc."

Case Report

Patient 2. A 40-year old man seen for intensive psychotherapy for the past ten consecutive months. Severe anxiety and panic which had been progressive for six months prior to his treatment. Depression was so severe at this time it was necessary to give nine electric shock treatments which dramatically cleared the affective component of his illness. A portion of his Rorschach interpretation is given:

"The number of responses was 17. The subject's inner life is not rich enough to give him poise and security for his dealings with the outer world, and the lack of M could be interpreted as lack of insight into his conflicts and his incompatible drives. Lack of c in this protocol leads to the interpretative hypothesis of egocentricity and an unbound need for affection and attention is suggested. Responses to cards I and VIII could be interpreted as a preoccupation with his body and its potency. A great part of his anxieties center around sex, castration complex, impotency and authority relationships. His reaction to the testing situation could be said to be immature, tending to be somewhat childish. He held each card at arm's length and occasionally would close one eye and then the other, and sometimes both. In testing the limits he was asked to pick out the card he liked best; he had a hard time doing it and preferred to "get rid of" the card he liked least first, thus thrusting card IV face down beyond reach on the bed. When the examiner was getting ready to leave, he was restless and said, "Thank you for the entertainment; come and see me again." The patient was also given a Minnesota Multiphasic Personality Inventory and Thematic Apperception Test. These are summarized as follows:

"His MMPI profile appears to be that of a markedly psychoneurotic person (hysterical-hypochondriacal type) with numerous physical complaints, considerable depression (agitated) and anxiety. He seems most unwilling to admit his "real" shortcomings to himself and to others. In all likelihood his extremely repressive control, which must be of a rather brittle sort, proves inadequate on occasion, so that a good deal of repressed material threatens to swarm into consciousness. It may be real or anticipated failure of the repressive system which is partly responsible for his anxiety and depression. Specifically, what this repressed material may be is not divulged in the MMPI, but it is believed that the TAT may throw some light on the matter.

"In general, his responses on the TAT are too brief and too objective to admit of satisfactory normative comparison with those of other people. He does, however, seem to show somewhat more than the expected proportion of these needs: Autonomy, affiliation (emotional), acquisition, creation, cognizance, blamavoidance and harmavoidance (terminology from Murray). He manifests fewer than the expected proportion of these needs: Aggression, dominance, achievement, nurturance, passivity and sex. He seems to feel the environmental press of lack and loss more frequently than would be expected.

"Superficially, on the level of his conscious attitudes, the patient seems to have pinned his faith onto the conventional symbols of success and creeds of behavior. Probably he has difficulty in understanding how a person can adhere closely to these conventional standards as they have been taught him, and still fail to attain or maintain a normal amount of satisfaction and a normal level of adjustment. He seems unwilling to recognize certain basic "selfish" needs within himself—which failure to recognize reduces only his ability to satisfy these needs—not their strength. His attempts to reconcile the situation on a conscious level are largely repressive denials of its existence, bolstered by a certain tendency to over intellectualize his problems."

The sound association responses to record 2 for this subject are as follows:

1 A. Something like a train—or a record scratching.

Q Do you want to tell me anything more about it?

A. The only thing—I wasn't absolutely sure it was a train. I wasn't entirely satisfied with that identification. I can grab any other thing.

2 A Someone being hurt.

Q Someone being hurt?

A. Child.

3. A. I could only hear one half of the conversation. Two people bickering about something or other. I could not catch the voice of the second part.

Q Does this mean anything to you?

A No. Generalized. Classification is bickering.

4 A. Dance music coming in on the radio, fluctuation in volume. I don't like that.

5. A. Someone very unhappy with an atmosphere of music to sustain that mood. A woman I take it.

Q. Anything more you want to tell me about it?

A. No. I can't think of anything more specific. The chance is that it's a badly done dramatic presentation.

6. A. On second thought, I don't think that's a voice.

Q. What do you think it was?

A. I don't know what it was. Something louder and slower than the dentist's drill. It doesn't sound particularly pleasant—I suppose my suggestion of a dentist's drill would suggest uncomfortable——the dentist's drill doesn't sound like that—it almost sounded like a voice. In which case it would be someone suffering. A long drawn out—continuing affair.

7. A. I can't tell you whether that was foreign language or unintelligible English. Whichever it was, it's not clearly recorded. More than one, at least two people were speaking—but I didn't understand—any of it—even the point of identifying the language.

8. A It sounds like some people who need help. There were a number of people—needing help—I heard the voice of more than—one—voice.

Q. Can you tell me the cause of that?

A. Pinned in a wreck. I told you that. They were just—calling for help—without—I made myself clear—if they knew someone would hear—there would have been more—life—more—emergency in their call.

9. A. A brass band.

10. A. Noise. Noise produced by a crowd—it's hard for me to be specific—it's crowd noise.

11. A. Piece of delicate machinery running out of adjustment—I know that's not very specific—but I didn't—.

12. A. They had a reception of the Gay Nineties program—and there was the announcer—and the announcer said something about wires—.

13. A. That's noise such as you might get—oh—if you had—attending a program—something was vibrating while some other thing was struck——if you. If you were way away—and getting the reflection rather than the thing itself.

14. A. A lady hysterical or badly upset. I shouldn't ask it in the form of a question, it's a theory I'm advancing.

Q. Lady hysterical?

A. I couldn't tell you—there was a man's voice saying something or other—at the start—she may have quarreled with her boy friend—to me the situation doesn't—suggest the cause one way or another.

15. A. Mechanical, wonderful old mechanical piano—one of those wonderful piano orchestra affairs in one of those road houses. Mechanical orchestra, something of that sort.

16. A. That was a radio spark going—and—sounds of distress.

17. A. That combination would suggest to me ship sinking, perhaps.

18. A. Laughter—number of people. Laughter rather forced. I guess—watching a performance of some kind. Not a particularly polite performance.

19. A. Lady being tortured.

Q. Can you tell me anything more about it?

A. No.

20. A. "Thank you very much ladies and gentlemen—. The breakup of a meeting perhaps—that—was thanking those who were able to come and then the other sounds—were bits of conversation as they broke up—my theory.

21. A. Well—sports announcer describing some event, I would say a baseball game.

Total time 40 minutes. I did not like the sound that sounded like someone in pain. I don't see—. Those indicating pain, the more intense the degree of pain the less I liked it. What I called the brass band was easiest to listen to.

Dr. Crook's tentative evaluation of the foregoing follows:

"Diagnosis: Anxiety state or compulsive-obsessive neurosis. These responses seem to be the production of an older man who is very unsure and insecure within himself and therefore vague and evasive in his responses. He seems 'nice' almost to the point of effeminacy. He appears to harbor, perhaps unconsciously, a grudge against, or a strong fear of, women (or both). Probably he fears that he is being destroyed by women—or, more likely, by a woman, whom he will continue to refer to as a 'lady' even when she is twisting the garrot. He feels that he has suffered and that he must probably keep on suffering, without much prospect of alleviation. His principal defenses, which are woefully inadequate, appear to be unsuccessful attempts at repression, plus intellectualization. Responses of special interest appear to be Nos. 6, 8, 11 (self-reference?) and 13, 14, 19. Probably important, but of uncertain significance, are his remarks in response to No. 8: 'I told you that' and 'I made myself clear'."

It will be noted that sounds are described according to the patient's own theories which are advanced tentatively, often defended or justified and occasionally rejected. They seem to belong to him, but he is not rigid in his adherence to them. "A lady hysterical or badly upset? I shouldn't ask it in the form of a question. It's a theory I'm advancing." He commonly rejects the word content of the record sequence, except those of appreciation and formal politeness. Things were frequently hopeless. When people were in pain, tortured, hysterical or in hopeless situations no one was present to help. Frequently he fragmented the sufferer into two or more people. Pain was inflicted, and there was torture. Women were either the aggressors, were suffering or acting a dramatic presentation. Those things he did not like he looked at from a distance—as if seeing the reflection at a distance or on a radio or dramatic performance. The effect was seen and described objectively. Suffering is long drawn out—a siren became an unpleasant dentist drill after rejecting the voice of the sufferer, precise description of the drill sound, instrument of suffering.

BLIND PEOPLE

The first 12 blind children, aged 6 to 10, were presented with the first 33 sounds. A group of 12 young adults, college students, aged 16 to 20, were used for comparison. This, of course, is not a good control source, but offers a preliminary basis of comparing the blind and sighted. The areas of apparent difference: the nonblind had a greater number of separate thought units (ratio 1.6 to 1). While the unpleasantness ratio was only slightly greater in the sighted subjects (1.08 to 1), the pleasantness ratio was considerably greater (2.2 to 1). A large ratio difference was in the relatively high incidence of denial of their own responses by the nonblind (2 to 1.0).

It is interesting to compare some specific responses. In the sound of the telephone ringing: Four blind children mention the caller or the reasons why he does not answer, which involve desire, such as the inability to be aroused. Four nonblind mention the reasons why the phone is not answered, three because no one is around, two because person is asleep, and one because it is the message of death. Four blind children mention the answer, one by mother, two by some distant faraway person. Two nonblind mention the time of the answer, one as "soon" and one as "hope soon" because of the message of emergency. In the sound of water dripping, the nonblind heard liquid or drops of water, etc., while the blind heard man walking, man walking in mud, man too lazy (twice), measure of time, rain, faucet or mud drip. Sound of rocks provoked few responses in the blind, but numerous mechanical and a few human responses in the sighted group.

The blind children often said "I see," and often heard more in sounds than others. In the telephone recording, for example, a child heard faint footsteps coming to answer the phone and the distance he had to travel was about the same as at his house. They liked the baseball game and often wanted to hear it a second time. One child asked to stay in the room and listen while the tester played records for other children.

Some people think by preference in auditory images in the language of sounds. They are said to be less common than visualizers, and they reason, imagine and remember by ear. These individuals could certainly be interesting subjects for auditory association tests.

THE CHRONICALLY ILL

We have played these preliminary records to a few tuberculous patients in a sanatorium and a project is now under way to compare these sanatorium patients to other chronically ill, hospitalized patients.

Large groups of normal and psychiatric patients must be tested. We should like to test also a number of lobotomized patients, primitive people, illiterates, aphasic patients, stammerers, stutterers, people with cerebral damage. Musicians as a class would provide an interesting study.

SAMPLE RESPONSES BY NORMAL SUBJECTS

Following are responses from the protocols of six subjects to show variability of response to the identical sound stimulus, a man crying for help:

Subject 1: "People having a fight . . . that reminds me of when I was a young kid . . . coming home from a dance . . . I heard somebody crying for help . . . my father always told me to keep my nose out of trouble . . . so I kept my nose out of trouble . . . "

Subject 2: "It sounds like a person . . . a woman in pain . . . who was sobbing . . . and trying to quiet her sounds down, almost sounds like she is calling for help . . . but if she was calling for help she would call louder . . . maybe she is weak with pain . . . sometimes when you are in pain you kind of lose your courage."

Subject 3: "This is distress . . . could be many things . . . could be even a dream, or someone going under anesthetic . . . more like a dream than anything else . . . somebody talking in their sleep."

Subject 4: "A cry or scream. Seem to be other people around but not particularly interested." (This is probably based on a very few muffled words of another voice which actually is the voice of someone coming to offer solace.)

Subject 5: "A grown woman very much upset. I can hardly bear to hear it."

Subject 6: "It sounds like people in need of help. There were a number of people needing help. I heard the voice of more than one. They were pinned in a wreck. If they knew someone would hear, there would have been more life, more emergency in their call."

DISCUSSION

A sound association technique for psychologic testing has certain advantages: it permits the exploration of an additional sensory modality. Parental words of admonition, encouragement or threat are incorporated by way of the ear, and it has been suggested that the sensations which form the basis of the superego begin with the auditory stimuli of words. Some people are good visualizers and others good auditory receptors. A test of this sort might very well offer help where other media do not suit the patient as the best projection backdrop, or setting. There is the disadvantage of the need for a good high fidelity record-playing machine and a room free of extraneous noises. The value of the test will rest solely upon subsequent interpretation and use by ourselves and others of the revised records.

As a result of our early experience, we have now produced a selected set of 21 sounds for experimental psychiatric use. These have been made with the best sound equipment available by a sound engineer, psychiatrist, psychologist, actor, actress and children, in the sound studio and a hospital. Records are produced by Sound Recorders, Incorporated, in San Francisco. This record, which is available through the Palo Alto Medical Research Foundation contains the following sound sequences:

1. *Train* (leaving station; crowd, depot noises)
2. *Seagull, seawash background, conversation by two men*:
   A. Is that enough . . . ?
   B. Yah.
   A. How much *is* that?
   B. (pause) Well, just about right . . . isn't it?
   A. I think that's just about right.
   B. Put that away now.
   A. Just about right.
   B. Would that cover it better?
   A. Put that away now; are you set?
   B. O.K., let's go.
3. *Child cry and seagulls, soft background.*
4. *Clock striking and crowd noises*: "Ya, Ya."
5. *Slow drip of water.*
6. *Organ and poem* (male voice, clearly audible only on italicized words):

   To my years hath destiny denied
   The *glory of youth.* Ah,
   How art thou *fled* from view,
   Darling companion of my tender age,
   My hope, so *sorely* mourned!

   Is *this the fate* that time all men brings?
   Poor wretch, the *truth once plain*
   Thou wert *struck down with ease,* thy lifted hand
   Showing me cold death and a naked tomb
   Afar off grimly stand.
7. *Cry for help and background crowd noises.*
8. *Laughter and man and woman conversing*:
   A. Where did that damn thing come from?
   B. What thing?
   A. Mother said you can't always get what you want in this world, sister.
   B. What did you expect!
   A. Where is dad? Where did dad go?

9. *Music and sobs of woman* (15 sec.) *and man* (15 sec.)
10. *Man and woman arguing:*
    (Man speaks in anger)
    Man: Now what did you do all that for today? (Mumbling answer)
    Man: Huh? (Mumbling answer)
    Man: You know what I'm talking about! (Mumbling answer)
    Man: There's no excuse for it. (Mumbling answer)
    Man: You know damn well what I mean. (Mumbling answer)
    Man: You certainly did, and I'm ashamed. (Mumbling answer)
    Woman: Well, I wouldn't talk if I were you!
11. *Music and water sounds, ending with rush of water.* (Splash like fish in water or man drowning)
12. *Father scolding child and child crying—Why! Why! Why!*
13. *Footsteps, faster, door opens, closes, opens, rush of footsteps.*
14. *Baby crying and woman singing softly.*
15. *Cry of woman and man.*
16. *Sucking sounds* (human)
17. *Groaning, rubbing, kissing* (human)
18. *Breaking wood, ripping cloth.*
19. *Drill press.*
20. *Humming and whistling* (Man): Shut up! *More humming and whistling.*
21. *Train bells* (switch engine, loud bang, voices)

It is impossible to make adequate word pictures of the sounds. It was found inadvisable to adhere to a strict 30-second time sequence and the sounds are of sufficient length for satisfactory dramatic effect, 20 to 50 seconds.

The sound association technique here described is an abridged clinical environment-people-sound repertory. It is not complete, but sufficient to suggest a very wide range of sounds and sound associations. To this end, parts of the sounds are ambiguous and others highly structured. Words are used so that word association factors are involved as well. Part of the test is an auditory Rorschach—sound ink blots, so to speak—and part an auditory counterpart of Murray's Thematic Apperception Test, in which a story is suggested or the sound effects of a story presented.

Since, in the time sequence of any one sound sample, there are various components, there is selective listening, retention, scanning or association, just as in looking at a picture. Sound oscillographic records of the sound stimuli and even, perhaps, of sound responses would be interesting. Physiologic and psychic effects of the sound on the listener, such as changes in respiration, pulse, voice register, rhythm, resonance and range would be interesting to study.

SUMMARY

Sound association studies may be a valuable adjunct in study of personality structure.

An auditory projection technique is described which may be utilized in psychiatric research. One set of 33 highly structured sounds were used but were supplanted by two sets of 21 sounds, each of more ambiguous, less clearly structured sounds. A total of 117 subjects were given the sound association test. These included 90 controls, 12 blind children and 15 psychiatric patients. A final record of only 21 sounds has been made for clinical evaluation.

This is an auditory equivalent of the more common visual tests such as the Rorschach and Thematic Apperception Test. It would seem to be useful in many situations, particularly, however, for the blind and for those giving unsatisfactory responses to the usual visual methods. No secure interpretations can as yet be given.

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> "The perfect job in life is one which offers steady employment while the faculties remain active, reasonable remuneration, a succession of tasks sufficiently varied to demand constant care and provide constant interest, freedom from dictation or interference, and a knowledge that the work is necessary and beneficial. Most branches of medicine satisfy some of these demands, but few, other than surgery, satisfy all."
>
> —Sir William Ogilvie,
> Surgery: Orthodox and Heterodox

This is the third in a series of letters to Dr. J. A. Myers and the readers of the JOURNAL-LANCET *from Dr. Ancel Keys, director of the laboratory of physiological hygiene at the University of Minnesota, during a year of study and travel abroad. Other letters will follow in subsequent issues.*

Notes from a Medical Journey

November 20, 1951, Oxford, England

Dear Jay:

Spanish hospitality is not to be taken lightly; for its proper appreciation the official visitor should be endowed with a hyperactive digestive apparatus and an indifference about sleep. An oversized urinary bladder is also recommended.

Such was the nature of my thoughts as I put out the light at three o'clock of the mornings in Madrid. And then how to get to sleep, with the flavor of cigars and old brandy persisting and the pylorus obviously determined to give no passage to the french-fried squid, and suckling pig and the baked alaska. Supper -- with three wines -- at ten-thirty is only the latest gastronomic problem; the main meal began at two and, by hurrying, we were almost on time for the 5 o'clock conference of three hours. But breakfast arrives at seven-thirty, the cars with our hosts will be waiting at nine, and symptoms of acute hypoglycemia will develop midway in the long morning session. I wonder whether the sensations after subtotal gastrectomy are similar. I should have kept a chart for the five days.

The occasion was a conference on nutrition organized by Carlos Jimenez Diaz, professor of medicine and director of the Institute of Experimental Medicine. Besides the Spaniards and Portuguese, there were five foreign guests: Sinclair of England, Tremolieres of France, van Eekelen of Holland, Latsky of South Africa and United Nations, and myself. The discussions -- in English, Spanish and French -- were on familiar ground and many points of agreement were the same as reached last spring in Rome by the United Nations FAO/WHO Committee of which I was chairman. Here are a few of them, not in official form:

(1) Nutrition surveys must be basically medical and not merely a comparison of what people eat in contrast to what some pundits think they ought to eat.

(2) Pellagra is still pretty puzzling, in spite of nicotinic acid, tryptophane and Tom Spies.

(3) The U. S. National Research Council's recommended daily allowance of 75 mg. of ascorbic acid is far higher than any evidence will warrant.

(4) The world over, medical schools and schools of public health are neglecting teaching and research in nutrition as a basic aspect of preventive medicine.

Our meetings were held at the University City, now almost rebuilt after its demolition in the Civil War. On the hill behind the medical buildings the great new hospital is rising; from it patients and staff will look out over one of the world's largest and handsomest campuses. To the south are great student dormitories; to the east large blocks of elegant flats are being completed for the professors. But, contemplating those stately avenues I suspected that the students, and many ill-paid professors and staff, will be footsore from the great distances to be covered. The clinical professors have their big cars and chauffeurs, but that means all the strains of a fashionable practice and precious little leisure for quiet scholarship.

Spain is a land of great contrasts. Bread and olive oil are still rationed but the meat portion of an upper class meal would feed a British family for a month. The amount of the bread ration is inversely proportional to one's economic station; if you are rich you have to worry along on meats and cakes! The facts of the national economy are dismal, but in Madrid I saw more new Cadillacs than since leaving New York. Their owners have paid 100 per cent customs duties -- in U. S. dollars -- as well as high excise taxes, but they have enough left over to assure that their ladies are bejeweled as Tiffany and Cartier would recommend.

It is grist to my mill that coronary disease is a problem among wealthy people of Spain but, apparently, scarcely exists in the general population. I hope to return in May for data and observations on diet and serum cholesterol.

Since returning to England I have been digging into British vital statistics and find that the coronary disease problem has increased enormously in the past few decades; the rise continues through 1949. This seemed at variance with my ideas about dietary fat in the etiology of atherosclerosis, but now I discover that the average British diet has steadily moved to become a high fat diet like our own. Even in the war years and after the proportion of calories from fats seems to have been far higher than fifty years ago. But the cholesterol intake has probably gone down -- and you know I believe that the dietary cholesterol is unimportant.

So far, so good. But this means I must get data on other countries besides Britain. Hence my interest in Spain, Italy, and the Orient, where fat intakes are reputed to be very low and the local physicians disclaim the existence of real coronary problems. But I am vexed about the Orient. Facilities and some small financial aid are offered for studies in Formosa, Calcutta, and Ceylon but I have had to decline. My time is too short this year and the expense of travel is too great.

This whole field of the epidemiology of metabolic disorders and "degenerative" diseases and the research approach through the study of samples of populations who live very differently greatly appeals to me. But it is all very difficult because of the limitations of time and money. Give me ...... Ah, well! Anyway this is a great area of research for a new public health of the future.

With best wishes to you all, I am as ever,

Ancel Keys

Lancet CLINICAL REVIEWS

EDITOR'S NOTE: *With this, the January 1952 issue,* THE JOURNAL-LANCET *introduces a new department under the title of Lancet Clinical Reviews. It will be devoted to reports on cases in which all appropriate diagnostic criteria have been employed, the best known treatment administered and the results recorded. Brief discussions of disease or conditions found will be presented in some cases. It is desired that these case reports be so prepared that they may be read with profit by physicians in general practice, hospital residents and interns and may be of considerable value to junior and senior students of medicine. This department will welcome such reports from individuals or groups of physicians who have suitable cases which they desire to present. Manuscripts should be directed to Editorial Department,* THE JOURNAL-LANCET, *84 South Tenth Street, Minneapolis 3, Minnesota.*

Clinicopathological Conference*

Minneapolis Veterans Hospital

Edited by JAMES F. HAMMARSTEN, M.D.
Assisted by N. L. GAULT, M.D. and R. I. LUBIN, M.D.
Minneapolis, Minnesota

CASE 1

PRESENTATION OF CASE

A 67-YEAR-OLD retired postal clerk was admitted to this hospital on May 18, 1951, because of low back pain, night sweats, arthralgia and weight loss. For the previous year he had noted progressive weakness and fatigue. Four months prior to admission he noticed diffuse, dull pain in the lower lumbar region, without radiation. This was aggravated by exertion and straining at stool, and persisted for approximately two months. At the same time he had stiffness, swelling and pain of the knuckles and wrists of both hands with right metatarsal area swelling. The arthralgia persisted. He subsequently developed night sweats without chills. He was anorexic for eight weeks prior to admission and lost 40 pounds. His local physician treated him with antibiotics for 17 days without effect at a local hospital.

Past history revealed that he had worked on a farm in 1905 and drank raw milk at that time. There had been no known exposure to tuberculosis. Twenty-five years prior to admission he was told he had an ulcer and had been treated with a suitable diet and medications since that time. Three years before admission he suffered a "nervous breakdown" which lasted approximately six months and was thought to be agitated depression. He had noted hoarseness for 40 years after he was struck in the neck with a pitchfork with a resultant unilateral vocal cord paralysis. He had had right herniorrhaphy seven years and tonsillectomy six years prior to admission.

Physical examination showed a well-developed, moderately well-nourished pale white male, who was in no acute distress but appeared chronically ill. Examination of the head and neck revealed no abnormality. There was diminution of breath sounds at the left base and a few moist rales at both bases. The vital capacity was 2.2 liters. Cardiovascular examination was negative. The liver was palpated at the right costal margin. The spleen was not palpable. No costal vertebral angle tenderness or masses were noted. There was a right direct inguinal hernia which was reducible. The testes were atrophic. Rectal examination showed the prostate to be "2 plus" enlarged. Neurological examination was normal. There were left posterior auricular nodes and small, axillary, inguinal and epitroclear nodes present. The extremities and back appeared normal. The left vocal cord was fixed in the abducted position. He had generalized erythroderma.

The temperature was 99.4° F., pulse rate 90 per minute, and blood pressure 130 mm. Hg systolic and 70 mm. diastolic.

An admission hemogram revealed hemoglobin of 10.0 gm. per 100 ml., red blood cell count of 3.76 million per mm.,^{3} hematocrit of 34 per cent and white blood count of 16,300 per mm.^{3} with 90 per cent neutrophils, 4 per cent monocytes, 5 per cent eosinophils and 1 per cent basophils. Erythrocyte sedimentation rate was 112 mm. per hour. Repeated white blood cell counts showed leukocytosis of up to 19,700 with 90 per cent neutrophils and 1 to 7 per cent eosinophils. The circulating eosinophils by direct count were 444 per mm.^{3} The hemoglobin decreased to 8.2 gm. per 100 ml. and was then corrected by several transfusions. The platelet count was 507,000 per mm.^{3} Blood Kahn was doubtful and blood Wassermann negative.

Admission urinalysis demonstrated acid reaction, specific gravity of 1019, 3 plus test for albumin and negative test for reducing substance. There were 30 to 35 granular casts per low-power field and six to eight white blood cells with eight to ten red blood cells per high-power field. Numerous tests for Bence-Jones protein were negative. The urine consistently showed one to three plus albumin, 8 to 20 red blood cells per high-power field and 10 to 30 granular casts. The number of white blood cells in the urine gradually increased up to a packed field. The initial urine cultures were negative but two subsequent cultures showed E. coli. A phenolsulphonthalein test showed 5 per cent dye excretion in 15 minutes and less than 5 per cent in the second 15 minute period. Glucosuria, from a trace to one plus, was present on four occasions. The blood urea nitrogen was 29.5 mg. per 100 ml. and gradually increased to 225 mg. per 100 ml. The blood chloride was 105 MEq per liter. The CO_2 was 24.3 MEq per liter initially and gradually decreased to 9.9 MEq per liter. The serum calcium was 8.2 mg. per 100 ml. and the phosphorus 9.8 mg. per 100 ml. three weeks after admission. The phosphorus increased to 16.2 mg. per 100 ml. while the calcium remained unchanged. Three weeks after admission serum sodium was 131.3 MEq per liter and potassium 5.96 MEq per 100 ml. The serum potassium increased to 9.12 MEq per liter.

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The serum protein was 6.5 gm. per 100 ml. with 3.0 gm. albumin and 3.5 gm. globulin. The acid and alkaline phosphatase were 1.2 and 14 King-Armstrong units respectively. The blood sugar was 105 mg. per 100 ml. A glucose tolerance test gave the following results: fasting 119 mg. per 100 ml., ½ hour = 193, 1 hour = 218, 2 hours = 222 and 3 hours = 174. Glucose was present in the urine of samples collected at corresponding times. A serum amylase was 66 units.

Numerous sputum examinations for acid-fast bacilli were negative. Many stool examinations for blood, ova, and parasites were negative. Several blood cultures revealed no pathogens. Spinal fluid revealed one red blood cell and one white blood cell per $mm.^3$, a sugar determination was 53 mg. per 100 ml. and a spinal fluid protein was 40 mg. per 100 ml. A culture of the spinal fluid was negative. A complement fixation test was negative and a gold curve was 0111100000. Liver function tests revealed a bromsulfalein retention of 11.5 per cent. The prothrombin time was 14.3 seconds with a control of 13 seconds. The one minute serum bilirubin was 0.1 mg. and the total 0.5 mg. per 100 ml. Thymol turbidity was 11.1 units and a zinc sulfate turbidity 24.5 units. Cephalin flocculation determination was 3 plus in 24 hours and 4 plus in 48 hours. The fecal urobilinogen was 34.4 mg. per 24 hours.

Agglutinations for brucella, typhoid, and tularemia were all negative. A bone marrow examination showed myeloid hyperplasia with a slight increase in the number of mature plasma cells. The electrocardiogram was normal.

X-ray films of the chest were normal except for some obliteration of the left costophrenic sinus. A barium meal demonstrated a deformed duodenal bulb with eccentricity of the pylorus. X-ray studies of the long bones, skull, and spine were negative except for mild hypertrophic changes in the lumbar vertebrae. X-ray films of the hands and feet were normal. An intravenous pyelogram was negative except for poor dye concentration bilaterally, and retrograde pyelograms were normal.

The patient was febrile during the first month in the hospital with temperatures up to 102° F. daily. He continued to lose weight and to complain of generalized weakness and stiffness of the joints of the hands and feet. He became progressively more lethargic and anorexic and had generalized pruritus. The blood pressure remained normal.

Cystoscopy was negative. Urine obtained from the right kidney showed occasional red blood cells and that from the left kidney a few white blood cells and occasional red blood cells.

He received numerous transfusions and after the positive urine cultures were obtained he was given chloromycetin. He had profuse bleeding from the rectum and persistent vomiting. He became confused and had a generalized convulsion, following which he was comatose. After another convulsion he died on the forty-fourth hospital day.

DISCUSSION

DR. CHAPMAN*: May we see the x-ray films?

DR. O'LOUGHLIN: These are the films. The interpretation is as described in the protocol.

DR. CHAPMAN: At what interval was the intravenous pyelogram done?

DR. O'LOUGHLIN: Four days after admission.

DR. CHAPMAN: What was the blood-urea-nitrogen at that time?

DR. HAMMARSTEN: 30 mg. per 100 ml.

DR. CHAPMAN: After Dr. Hammarsten told me there was going to be a new deal today (i. e., that the discussion was to be published), I thought about approaching this somewhat differently. What I would like to do is to write on the board three groups of diseases. Naturally, I think this case will have to fall into one of the groups, although that may be wrong, too. Incidentally, the order in which I will put these on the board does not make any particular sense except insofar as it reflects some of the facets in my own peculiar personality and professional interests. In Group one I will put Hodgkin's disease, polyarteritis nodosa, and disseminated tuberculosis—all three favorite clinical-pathologic-conference diseases. It will be wonderful if it should turn out to be one of these three. And next, in Group two, I'll put bacterial endocarditis, and we can throw in brucellosis, although I am not too enthusiastic about it. Then we might say leukemia, not specifying any particular type in order to keep as much out of trouble as possible. Finally, I think we could put here something that is not really a group—we could just say question of primary renal disease. After all, this man did die of uremia, I take it.

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Now what sort of case can we make for Hodgkin's disease? I would like very much for this to turn out to be Hodgkin's disease. It is a disease I have been particularly interested in and so I will try to make a case for it. Now the story, the onset, and so forth would work out all right. Apparently when he came in, night sweats and weight loss were things that bothered him the most. This question of arthralgia and low back pain sounds to me as though it may not have been terribly important and I shall assume there was no evidence of actual arthritis in this man. Is that correct?

DR. HAMMARSTEN: That is correct.

DR. CHAPMAN: The onset then, I think, would go along pretty well with Hodgkin's disease, and certainly the prodigious weight loss that we see taking place two months before he came in fits too.

Now the past history—I think we can save time if we just discard the whole thing. I do not know what to do with any of it. We might take a look at the question of a nervous breakdown and see whether that had anything to do with systemic disease of some sort. But I can't fit it in. So I'll have to leave out the past history altogether.

In the physical examination we find he was pale. We also note that in that same paragraph he is said to have generalized erythroderma. Well now, as I understand it, that word means red skin. Is that correct? Well, what was this man—was he pale when he came in, or did he actually have red skin?

DR. HAMMARSTEN: I wrote the protocol, but I'm afraid I can't explain that discrepancy.

DR. CHAPMAN: Well, I have a slight advantage in that, as you know, Dr. Dahl is now working with us over in the Heart hospital and he got very excited when he read over this, and he said the man was pale—he was not red at all. But I would like to know a little more about this erythroderma. Who saw it? Did any one see it?

A RESIDENT: I saw him. He had a generalized erythematous rash, limited on admission, but shortly afterwards it became generalized over the trunk. His mucous membranes were pale and his face was pale.

DR. CHAPMAN: Did his skin look blotchy, or was it more like a sunburn?

A RESIDENT: More like a sunburn.

DR. CHAPMAN: Well, there again, of course, Hodgkin's disease can invade the skin and can give just that type of appearance—a fresh sunburn appearance. Then, too, in the physical examination we note that he did have some lymphadenopathy. The spleen wasn't palpable, which is rather a blow. If we assume this man has Hodgkin's disease, we will have to assume it is doing something to his kidneys. But more of that in a moment.

There is nothing in the hemogram that is against the diagnosis of Hodgkin's disease. He has got an anemia certainly. And these white counts would go with Hodgkin's disease. Ordinarily we would have to take this white count to mean the presence of some very active infection, or the presence of tissue destruction. Of tissue destruction there is plenty in acutely advancing Hodgkin's disease, so that we do see white counts like these in the presence of that disease. The eosinophils go along although they are not necessary for the diagnosis. This fall in hemoglobin is perfectly consistent with it.

But now we come to the question of the urine and we are in trouble. This man apparently has albuminuria when he comes in. There is some definite evidence of renal involvement from the very beginning. Then he proceeds to develop progressive renal functional impairment until finally he dies with all the evidence of renal insufficiency, including what I interpreted to be uremia. Can that happen in Hodgkin's disease? I don't know. Last night I dispatched a telegram to my old friends, Doctors Jackson and Parker,[1] and I expected the usual violent reaction sometime today, but it did not come. I thought that possibly they might have seen such a case. I never have. It is difficult for me to see how we can account for this patient's terminal event on the basis of Hodgkin's disease. We might say that he had massive retroperitoneal involvement which somehow involved both kidneys. However, Hodgkin's disease rarely involves both kidneys diffusely enough to produce uremia. I don't think it ever does—at least I cannot find any mention of it having done so. One might consider possibly that these nodes—these hypothetical nodes—are closing off both ureters. That is not a very good story in view of the fact that we do have pyelograms on this man. Furthermore, the urine suggests actual parenchymal involvement of the kidneys themselves. I think that is the most serious blow to the diagnosis of Hodgkin's disease, and so must leave it with some regret.

I put polyarteritis as second just as a matter of fact. I cannot find anything in the protocol which rules that diagnosis out. The course of the disease is perfectly consistent with it; so are the laboratory findings, and so is the uremic death. So if we can strike off Hodgkin's disease, we have to leave polyarteritis.

What about disseminated tuberculosis? The story again is consistent with that diagnosis and so are most of the laboratory findings. We would stumble a little, I think, when we come to the matter of the white count with the rather marked elevation and enormous increase in neutrophilic percentage. We do see that increase in neutrophilic percentage in rapidly advancing disseminating tuberculosis, but I should say that white counts this high would be unusual in the disease, and furthermore, again we come up against this question of the terminal event which is renal failure, and I don't believe we could very easily account for that on the basis of the disseminated tuberculosis. In fact, I looked in Dr. Bell's[2] book to see if I could find some mention of renal failure on the basis of Hodgkin's disease and disseminated tuberculosis, but he didn't even mention Hodgkin's disease. However, we still have this man dying of renal failure. Disseminated tuberculosis, I think, might conceivably do it, but again it would be a very unusual event. If we are talking about miliary tuberculosis we are talking about multiple small lesions in the kidney, and ordinarily the patient wouldn't live long enough for these to spread and destroy enough renal parenchyma and so destroy or kill the patient. Chronic tuberculosis—tuberculoma in the kidney—occurs, and there again we certainly expect to see something suggestive of renal insufficiency. Again I consider this less likely and must admit, I suppose, that it is barely possible.

Bacterial endocarditis could do all of this, so there is nothing that could rule that out. The only thing is that we have absolutely no evidence of any heart disease in this man. I think it would be a little unfair to ring that in on me if this man actually does turn out to have bacterial endocarditis without some hint of heart disease.

DR. BELL: Dr. Hammarsten might do it.

DR. CHAPMAN: Well, he might, but he ought not to do it. I still have to take it as I find it.

Brucellosis—now that I just put in here because I suppose brucella infection could do all of this, and then Dr. Hammarsten included this tantalizing little bit about how the man drank raw milk in 1905, and presumably those brucella organisms were lurking around there for some 45 years without doing anything and finally decided to come forth and produce fatal illness. Barely possible, I suppose, but I will just discard that.

The matter of leukemia I put in here for the sake of completeness, but in some bizarre leukemias we do see courses not altogether unlike this. But again the blood counts as they are presented to us don't really bear that out. I suppose one might argue that he could have a chronic myelogenous leukemia but still his course was at least subacute, and we would expect to see more than that in the peripheral blood. The normal bone marrow doesn't support that diagnosis either.

Now, could primary renal disease do this? I think, of course, glomerulonephritis could possibly be considered. That's about the only one I think of that we should mention in this connection. But here again I don't believe the course is really suitable for such a diagnosis. I will hasten to add, however, that acute glomerulonephritis, which we would have to call this, certainly can occur in this age group. It is not exclusively a disease of children and we certainly couldn't rule it out on the basis of the patient's age. I would consider it unlikely largely on this basis of his history. It would be an unusual course for the disease and I simply believe some of these other things are more likely.

Without belaboring this issue any longer I think we can put polyarteritis nodosa as first choice, and it is hard to see whether there is any second choice which one might really have. I'll put disseminated tubercuolsis as second choice although it is a very poor one. I think I can leave out all the rest of them.

DR. BELL: Are you troubled any, Carl, by the absence of hypertension in your No. 1 diagnosis?

DR. CHAPMAN: I noted it, but I wasn't particularly troubled by it. Polyarteritis can certainly bring a patient to death without producing hypertension. In fact some of the figures run from 40 to 60 per cent without hypertension.

DR. BELL: Uremic death without hypertension is a little hard to get around.

DR. CHAPMAN: I presume most likely they would have hypertension if they die of uremia. I doubt very much if it would rule it out.

DR. STEAD: What about the marked pyuria with the cultures of E. coli in the urine?

DR. CHAPMAN: I do not know how significant the E. coli is. I assume it was probably of no significance. And the change in the number of cells can happen in polyarteritis nodosa, so I have not attempted to explain that on the basis of a specific urinary tract infection.

A RESIDENT: What about this diabetic type glucose tolerance curve?

DR. CHAPMAN: Of course, this man in essence was starving to death. I think the abnormal glucose tolerance can best be explained on that basis.

DR. BELL: You do not think he has diabetes?

DR. CHAPMAN: I do not believe you can say he has diabetes on the basis of that curve when he has lost 40 to 50 pounds.

DR. STEAD: I believe that multiple myeloma was considered early in the diagnostic thinking.

DR. CHAPMAN: Well, that's very interesting, but I don't see anything in particular to support it. The absence of Bence Jones protein wouldn't rule it out. After all, you have a normal bone marrow and a lot of x-rays.

DR. EBERT: I think the diagnosis in all fairness was considered before the bone marrow and x-ray studies were obtained.

A RESIDENT: I would like to ask Dr. Chapman if he thinks secondary amyloidosis with Hodgkin's disease would explain the uremia without hypertension.

DR. CHAPMAN: Well, it is a good thought; I'll confess I hadn't thought of it. I do not know how often secondary amyloidosis occurs in the presence of Hodgkin's. No doubt it can occur.

DR. HAMMARSTEN: There have been several cases reported. One about a year and a half ago in the New England Journal of Medicine.[3] They also referred to a paper from the Mayo Clinic.[4]

DR. BELL: Uremia with amyloidosis secondary to Hodgkin's disease must be very rare. You get a little amyloid in the kidneys, enough to give albuminuria, but how about uremia?

DR. CHAPMAN: I was unable to find a case of Hodgkin's disease who died with uremia.

DR. EBERT: Bilateral retroperitoneal lymphadenopathy may cause bilateral obstruction of ureters in Hodgkin's disease leading to uremia.

DR. CHAPMAN: That must be very rare.

DR. EBERT: I agree. But we have had a case here who died in uremia.

A RESIDENT: In what way could you rule out carcinoma of the tail of the pancreas?

DR. CHAPMAN: I haven't got much to say about that. Since this patient's course was febrile I think you would have to work in some disease that characteristically accents fever.

DR. HAMMARSTEN: We had four medical students here today and they all arrived at a different diagnosis. One was carcinoma of the pancreas; one was multiple myeloma; another was Hodgkin's disease, and the fourth man arrived at the same diagnosis as Dr. Chapman did.

DR. HELLER: I'd like to say a few words. I certainly agree with Dr. Chapman on the basis of the case as given. I don't see how any other diagnosis can be made. And so far as the absence of hypertension is concerned, Dr. Bell, eight of 18 cases in your series had glomerulonephritis.[2] If glomerulonephritis becomes chronic, about 20 per cent of the cases have normal blood pressure. I do not see why it is different in polyarteritis nodosa.

DR. BELL: I do not think the percentage is that high for glomerulonephritis in polyarteritis. There is a primary renal disease that nobody has talked about which can give most of this.

DR. CHAPMAN: Coming from you, Dr. Bell, that must be polycystic disease. The normal x-ray would mitigate against that. I also thought about primary renal cell carcinoma, but I threw that out.

DR. BELL: What about bilateral descending pyelonephritis?

DR. EBERT: Don't you think, Dr. Bell, for that diagnosis there should be small kidneys or some distortion of contour on the intravenous pyelogram?

DR. BELL: No, the descending type of pyelonephritis doesn't change the pyelogram very much.

DR. HELLER: What do you think about the degree of albuminuria for the diagnosis of pyelonephritis? It is my impression that with pyelonephritis there is usually minimal albuminuria.

DR. BELL: There is usually some albuminuria. He had lots of pus in his urine all the time unless you want to make that a cystitis. Pyelonephritis explains everything except his eosinophils and his arthralgia. Furthermore, pyelonephritis does not have hypertension.

DR. EBERT: Another thing, Dr. Bell, I think you would agree that in the male, in the absence of any type of obstruction, pyelonephritis leading to death is extremely uncommon.

DR. BELL: It's uncommon, but it happens—the descending type.

DR. HELLER: What do you mean by the descending type?

DR. BELL: Most pyelonephritis is due to obstruction, but a few are blood stream infections. That is what I mean by the descending type.

DR. CHAPMAN: I doubt very much if you could explain all of this by pyelonephritis. Of course, if this man was a diabetic, he could have had a pyelonephritis, bloodborne. He could have had multiple abscesses in his kidneys, but after all, he has a definite history that goes back at least a year. That's a mighty long course for that disease, Dr. Bell.

DR. BELL: That disease may last for years.

DR. CHAPMAN: You don't see it lasting for years in diabetes.

DR. BELL: Well, not if it is due to his diabetes.

DR. HELLER: This glucose tolerance curve is something which is worth discussion. It couldn't be due to starvation because the fasting blood sugar was 105. Van Slyke[5] found that in the presence of azotemia you can get a falsely elevated blood sugar due to non-glucose reducing substances.

DR. BELL: But you don't get urine sugar.

DR. HELLER: I think you can get glycosuria, too, due to tubular destruction with decreased TMg.

DR. BELL: I have seen the hyperglycemia but not the glycosuria.

DR. HELLER: Glycosuria has occurred in a few patients we have seen here with renal insufficiency.

DR. BELL: You don't think he had diabetes then?

DR. HELLER: I don't think from this evidence that one could make a diagnosis of diabetes. Van Slyke showed that there is a non-glucose reducing substance present in the normal. If one uses the old method the residual is glutathione and glucuronic acid. As far as I can tell it hasn't been investigated in uremia. But on the evidence here I don't think you can make a diagnosis of diabetes.

DR. EBERT: The fact that the urine sugar was only a trace to 1 plus would fit with renal disease.

DR. EVANS: I believe this was a diabetic type curve.

DR. HELLER: How can you say this is a diabetic curve?

DR. EVANS: Fasting blood sugar of 119 is too high for starvation and the general shape of the curve is that of diabetes.

A RESIDENT: What was the clinical diagnosis?

DR. HAMMARSTEN: The clinical diagnosis varied. Dr. Hagen, you saw him. What was your diagnosis?

DR. HAGEN: I got caught on my own interpretation of the bone marrow. I called it multiple myeloma.

DR. HAMMARSTEN: So Dr. Hagen thought he had multiple myeloma and Dr. Ebert thought he had polyarteritis nodosa, and the residents chose sides.

DR. HELLER: How many times was he catheterized for phenosulfonphthalein test and other studies?

A RESIDENT: He was catheterized several times for culture and for phenosulfonphthalein test and an indwelling catheter was in place the last few days.

DR. HELLER: I think that is extremely important.

DIAGNOSES

Clinical diagnosis: Polyarteritis nodosa? Multiple myeloma?

Dr. Chapman's diagnosis: Polyarteritis nodosa?

Anatomical diagnosis: Bilateral pyelonephritis. Polyarteritis nodosa.

PATHOLOGICAL DISCUSSION

DR. GLEASON: The heart weighed 400 gm. and there was quite a marked fibrinous pericarditis fusing the pericardial surfaces together. There was a small scar in the left apex of the lungs, apparently healed tuberculosis. The spleen weighed 300 gm. There was a marked old perisplenitis with adhesions to the abdominal wall and adjacent viscera. No gross infarcts were found in his spleen. The liver weighed 1725 gm., and it was normal grossly. The left kidney weighed 160 gm.; the right kidney weighed 175 gm. Both were essentially normal, with just a few little petechiæ on the surface, but when you cut through there were no petechiæ or infarcts. It was difficult to differentiate between the cortex and the medulla.

DR. BELL: We have no infarcts, have we?

DR. GLEASON: The arteries of the body were carefully explored and we found no nodular vascular lesions. There were no infarcts in any organ. We had no gross diagnosis.

On microscopical examination there was infiltration down through the kidney and clumps of polymorphonuclears in the tubules. The kidneys under high power showed a lot of tubular atrophy and diffuse infiltrate throughout the kidneys (figure 1). The glomeruli looked essentially normal. This picture is seen in both kidneys. I don't think there is any doubt the man had a severe pyelonephritis which probably should be labeled about a subacute. Here is the lesion you want, Dr. Chapman (figure 2).

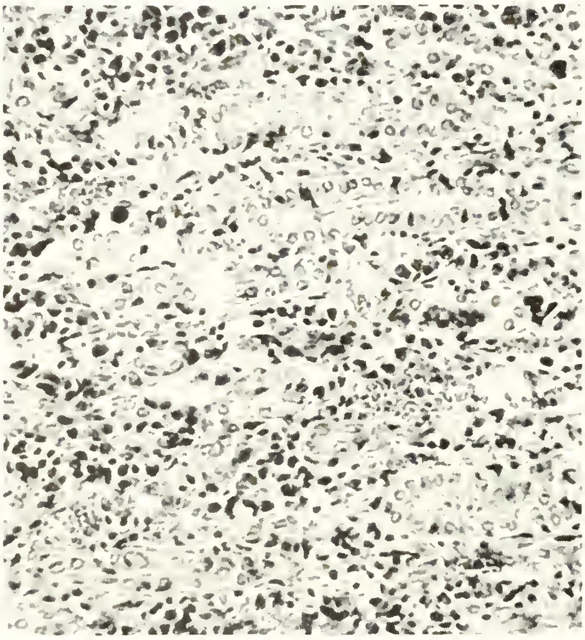

Fig. 1. Cross section of kidney showing tubular atrophy and diffuse infiltration.

DR. CHAPMAN: I don't want it, but I am glad to see it.

DR. GLEASON: These are very good lesions for polyarteritis (figure 2). There is necrosis of the medial wall and infiltration throughout with thickening of the intima and adventitia. The same lesions were found in the spleen, liver and testes. Two vessels in the spleen showed aneurysmal dilatation.

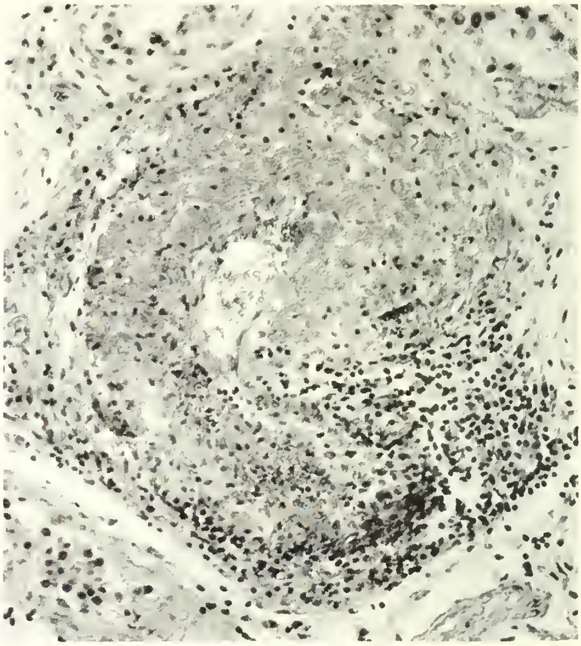

Fig. 2. Cross section of kidney showing necrosis of medial wall and infiltration.

DR. BELL: Those aneurysms may rupture sometime if they are not supported by surrounding tissue.

DR. GLEASON: The peripheral nerves showed several good acute lesions.

DR. BELL: That's the explanation of the peripheral neuritis that these people have. The lesions cause anoxia of the nerve. We think that's the explanation of the peripheral neuritis.

We shall have to find the cause for this 3 and 4 plus cephalin flocculation.

DR. GLEASON: There were acute and chronic lesions throughout the liver, but as a whole the liver looked pretty good. There is at least one islet in the pancreas which showed some hyalin changes.

Our pathological interpertation is a subacute severe bilateral pyelonephritis, probably hematogenous in origin. But he also has polyarteritis nodosa, which is definite and involves many different organs, including the kidneys. We feel that it was of relatively minor significance in this case. We think the pyelonephritis is the primary disease.

DR. CHAPMAN: How can you account for this man's history on the basis of pyelonephritis? I feel this man had been too desperately sick for too long a time to kill him off with pyelonephritis.

DR. BELL: The major cause of his symptoms is this extensive bilateral pyelonephritis. If he has uremia, the cause is not infarctions due to the polyarteritis but to extensive infiltration of pyelonephritis scattered throughout his kidneys. He has the lesions of polyarteritis scattered through his kidneys but not enough to produce renal insufficiency. The question of what these had to do with one another is what we don't know. I think it is easier to think of it as pyelonephritis first and polyarteritis second. Conceivably it could be the other way around. I think if you look at the story, everything he had is explainable by the pyelonephritis. Except that the eosinophilia and arthralgia don't fit. That's due to the polyarteritis as we can see now in retrospect.

DR. HELLER: I don't quite agree with that. You can't explain one year's weakness and fatigability when a man comes into the hospital with a blood-urea-nitrogen of 29.5. I don't think you can explain the arthralgia and the weight loss of 40 pounds by the mild azotemia he had when he was admitted. Certainly if you leave an indwelling catheter in over three to five days you will end up with pyelonephritis.

DR. BELL: He had a blood-urea-nitrogen of 29 before the catheter was put in.

DR. EBERT: I agree with Dr. Heller. In the first place I think we can assume that a patient with prostatic hypertrophy and repeated catheterizations would invariably get an infection.

DR. BELL: Tell the urologists that.

DR. EBERT: We do. When we catheterize a patient with a debilitating disease repeatedly, we expect to end up with a pyelonephritis.

DR. BELL: Some of these people catheterize themselves for 20 years and don't get pyelonephritis.

DR. EBERT: It is our clinical impression that people with debilitating disease develop pyelonephritis more rapidly than other people.

DR. BELL: I know that could happen, but I don't think it happens often.

DR. EBERT: Furthermore, Dr. Bell, when this man came in he had only eight to ten white blood cells and the culture was negative.

DR. BELL: But the story of a hematogenous pyelonephritis may be a long-drawn-out one. My best case lasted twenty years. He died of uremia and never had hypertension. This patient doesn't have hypertension. Renal insufficiency without hypertension rules out a lot of things. The pyuria here, too, makes one think it is pyelonephritis. When polyarteritis causes uremia, it is due to renal infarcts. There were no infarcts here. They almost invariably have hypertension if the uremia is due to polyarteritis.

DR. EBERT: There is no question that this patient had pyelonephritis and that it contributed to the uremia, but it is our feeling that he entered with polyarteritis and that we gave him the pyelonephritis which then went on to uremia. Is that your impression, Dr. Chapman?

DR. CHAPMAN: Yes.

DR. BELL: I think he entered with both and the pyelonephritis is the major cause of his death.

DR. CHAPMAN: I don't think there is any disgrace in the clinicians and the pathologists disagreeing.

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Hematologic Manifestations of Sarcoidosis

Report of Two Cases

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SARCOIDOSIS, a disease of unknown cause, produces varied symptoms, depending upon the major sites of involvement. The diagnosis can often be suspected on clinical grounds but can be confirmed only by demonstration of the characteristic lesion, an infectious type of noncaseating granuloma.

A number of authors have cited unusual manifestations of the disease. We wish to report two cases, seen within a short period of time, in both of which interesting clinical and hematologic complications were presented. In one case the disease simulated rather closely congenital hemolytic icterus, and in the other, Banti's syndrome with concurrent pregnancy was demonstrated.

REPORT OF CASES

Case 1. A 15-year-old girl came to the Mayo Clinic in June, 1951, with a complaint of anemia and "spleen trouble." At the age of nine, after an attack of measles, she was told that her blood was "low", she was given iron by mouth, and she underwent tonsillectomy and adenoidectomy. At the age of ten, she had an influenza-like syndrome, was suspected of having poliomyelitis, and was hospitalized elsewhere. The value for hemoglobin at that time was 43 per cent and there was a question of slight jaundice clinically. The spleen was said to have been palpable. She had undergone transfusion of 250 cc. of whole blood on two occasions, with a chill following the first one. Again iron by mouth had been prescribed. Her condition was followed rather regularly, as far as the hemoglobin was concerned, in the course of examination at summer camp each year. She had been given iron because of the low values for hemoglobin, but this had been taken haphazardly. One year prior to her coming to the clinic the value for hemoglobin was 80 per cent, according to the history. Nine months prior to admission, she had had a severe head cold and soreness of the throat that lasted about one month. The value for hemoglobin was said to be 30 per cent two months later, when she again, on two occasions, underwent transfusion of whole blood, supplemented by antibiotic therapy. One month prior to admission another cold developed and the value for hemoglobin was found to be 52 per cent. Again antibiotics were given for one week, and the patient twice underwent transfusion of whole blood. The spleen was not palpated at that time. No significant information was obtained from the family history, although the grandfather was said to have had pernicious anemia. The patient had had a normal menarche at the age of 14 and practically normal menses subsequently.

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Physical examination on admission revealed a moderately pale girl with no icterus, a blood pressure of 122 mm. of mercury systolic and 64 diastolic, a pulse rate of 84 per minute, and a temperature of 99° F. There was no lymphadenopathy and no hepatomegaly, but the spleen was palpable three fingerbreadths below the left costal margin.

Stereoscopic roentgenograms of the chest did not disclose any abnormality. The results of routine urinalysis were negative, with a specific gravity of 1.021. The value for hemoglobin was 11.2 gm. per 100 cc. of blood (74 per cent), the red blood cell count was 4,180,000 per cubic millimeter, the white blood cell count was 9,700, and the platelet count was 236,000. A differential blood count gave the following values: lymphocytes 35 per cent, monocytes 9 per cent, neutrophils 54 per cent, eosinophils 1 per cent, early myelocytes 0.5 per cent and normoblasts 0.5 per cent. The reticulocyte count was 18.5 per cent. The blood smear presented a hypochromic microcytic picture, with spherocytes, numerous Howell-Jolly bodies and polychromasia being observed. Toxic changes in the polymorphonuclear leukocytes were noted, and there was a slight monocytosis with some of the monocytes being reticular and suggestively immature. In studies of erythrocytic fragility, hemolysis was minimal in 0.48 per cent saline solution and complete in 0.34 per cent solution. The blood picture was consistent with a diagnosis of hemolytic anemia.

The results of other laboratory tests were as follows: The prothrombin time was 18 seconds, a normal control being 17 seconds. The sedimentation rate was 14 mm. in one hour (Westergren method) and a sulfobromophthalein test of hepatic function gave normal results. The direct bilirubin reaction was negative and the value for indirect bilirubin was 2.2 mg. per 100 cc. of serum. Thymol turbidity measured one unit and the cephalin-cholesterol flocculation test gave negative results. The results of a flocculation test for syphilis were negative. The antiglobulin or Coomb's test and an agglutination test for Brucella gave negative results. Roentgenographic examination of the gallbladder disclosed a normally functioning organ without stones. The results of fragility tests of the red blood cells of the parents were within normal range.

Splenectomy was performed on July 6, 1951. The spleen weighed 640 gm. Study by a pathologist revealed the presence of extremely congested splenic sinuses with moderate hyperplasia of the malpighian bodies. No excessive deposits of blood pigment were noted. Microscopic study of a lymph node obtained from the hilus of the spleen disclosed a noncaseous granuloma that had an appearance consistent with that of Boeck's sarcoid.

The patient did well immediately after operation. The value for hemoglobin rose to 12.8 gm. per 100 cc. (85 per cent). The direct reaction for bilirubin (van den Bergh) was negative; a value of 0.3 mg. per 100 cc. of serum was obtained by the indirect reaction. The results of a blood count were as follows: erythrocytes 4,130,000, leukocytes 9,100 and reticulocytes 1.4 per cent. In the test for fragility of the erythrocytes, hemolysis was minimal in 0.5 per cent saline solution and was complete in 0.38 per cent solution.

On September 1, 1951, according to the home doctor, the value for hemoglobin was 93 per cent and the leukocyte count was normal. The patient was feeling well, with more "pep" than she "had ever had."

Case 2. In May, 1951, a 33-year-old housewife came to the clinic with a complaint of enlarged spleen and anemia. The family history did not contribute any significant information. The patient had been in comparatively good health most of her life, except for attacks of chills and fever that had recurred at yearly intervals for several years. It was thought that she might have had slight jaundice a year previously. Tonsillectomy at the age of eight years was followed by some bleeding, as was cautery of the cervix a few years prior to her visit here. She had had two pregnancies; both had been complicated by hypertension but both had terminated in the delivery of normal babies. In March, 1951, she had consulted her doctor because she suspected that she was pregnant again, the date of the last menstrual period having been February 11, 1951. The abdomen was enlarged beyond what was to be expected in pregnancy of the indicated duration. The blood was found to be "low" and she underwent transfusion of whole blood. She had no abnormal bleeding and other than feeling a little weak she was asymptomatic except for awareness of excessive abdominal fullness which gradually increased.

Physical examination revealed a well-developed, well-nourished, white woman with a blood pressure of 144 mm. of mercury systolic and 84 diastolic, a pulse rate of 120 and a temperature of 99.6° F. There was no lymphadenopathy but the liver was enlarged and its edge was felt four fingerbreadths below the right costal margin. Also the spleen was enlarged, extending nearly to the iliac crest. The size of the uterus was consistent with that of pregnancy of four months' duration. The remainder of the examination was noncontributory.

Roentgenograms of the abdomen, chest, esophagus, stomach and duodenum did not disclose any abnormality. A roentgenogram of the gallbladder revealed a nonfunctioning organ. No esophageal varices could be seen by roentgenologic examination.

The results of urinalysis were negative except for a trace of albumin. The value for hemoglobin was 11.5 gm. per 100 cc. of blood, or 77 per cent, the erythrocyte count was 4,110,000, the leukocyte count 3,600, and the platelet count 93,000. The differential blood count was as follows: lymphocytes 11 per cent, monocytes 8 per cent, neutrophils 78.5 per cent, and eosinophils 2.5 per cent. The bleeding time was two minutes and 30 seconds. Morphologic study of the blood smear disclosed mild hypochromasia with anisocytosis, the red blood cells being essentially normocytic (the average diameter was 7.4 microns). There was not much polychromasia; however, slight increase in rouleau formation, slight toxic changes in the polymorphonuclear leukocytes and rarely an atypical lymphocyte were found. The sedimentation rate was 45 mm. in one hour (Westergren method), and a flocculation test for syphilis gave negative results. The value for urea was 18 mg. per 100 cc. of blood, the direct bilirubin reaction was negative and the indirect value was 0.7 mg. per 100 cc. of serum (van den Bergh method). A sulfobromophthalein test of hepatic function revealed grade 1 disturbance, with 8 per cent of the dye being retained. The concentration of serum cholesterol was 203 mg. per 100 cc. and the concentration of cholesterol esters was 90 mg. per 100 cc. The value for total serum protein was 7.47 gm. per 100 cc., with an albumin-globulin ratio of 3.98 to 3.49. Sternal aspiration revealed an active marrow with some relative diminution in the number of megakaryocytes.

Splenectomy was advised, and operation was performed on May 22, 1951. Evidence of rather severe portal hypertension was found, the pressure in a branch of the right gastroepiploic vein being 460 mm. of water. Because of this, end-to-side splenorenal anastomosis was performed in addition to splenectomy. An accessory spleen was found and removed, and biopsy of the liver was performed. A pathologist reported that there was grade 3 congestive splenomegaly (graded on a basis of 1 to 4), with moderate fibrosis, and that multiple noncaseous granulomatous tubercles were present. Similar changes were noted in the accessory spleen and in the liver, the latter being the site of granulomatous hepatitis characterized by the presence of multiple noncaseous tubercles.

After operation the blood platelet count rose abruptly to 363,000; then on the 17th postoperative day it rose to 645,000. Clinically, the patient did well.

In July, 1951, she returned for re-examination. She had no complaints of note. The pregnancy was progressing satisfactorily. The blood pressure was 134 systolic and 80 diastolic. The only abnormal physical finding was the presence of minimal ascites. The results of laboratory tests were as follows: hemoglobin 12.1 gm. per 100 cc., or 81 per cent, erythrocyte count 4,160,000, leukocyte count 10,200, and blood platelet count 230,000. Again there was grade 1 (8 per cent) retention of dye when the sulfobromophthalein test was performed. The direct reaction for bilirubin was negative, and the indirect reaction disclosed a concentration of 0.5 mg. per 100 cc. of serum. The value for total blood proteins was 6.85 gm. per 100 cc., with an albumin-globulin ratio of 3.16 to 3.24. The concentration of cholesterol in the blood was 203 mg. per 100 cc., and the concentration of cholesterol esters was 124 mg. The results of urinalysis were negative.

The patient recently reported to us that her pregnancy terminated uneventfully on November 8, 1951. The baby, weighing 7 pounds and 1 ounce, was born spontaneously.

COMMENT

We have reported two cases in which major hematologic complications occurred in patients with substantiated sarcoidosis. Such complications are rare although similar cases have been reported by other workers. Thus, in 1950, Bruschi and Howe[1] published an excellent review of the literature dealing with the hematologic variations seen in association with Boeck's sarcoid. They cited a few instances of patients who had sarcoidosis that was associated with acquired hemolytic anemia which went into remission subsequent to splenectomy. Other workers[2,3] have reported cases in which splenomegaly and thrombocytopenia were presumably secondary to Boeck's sarcoid. In most of these, the thrombocytopenia disappeared or improved after splenectomy. The occurrence of Banti's syndrome in a case of sarcoidosis has been described; likewise pancytopenia or so-called hypersplenism has been said to have occurred.[2,4]

It should be emphasized that such manifestations as mentioned above are exceptional and that in most cases of sarcoidosis there are no abnormal hematologic findings. Thus, while anemia occurs in a rare case, it is uncommon. The only hematologic variation found rather frequently appears to be a mild relative monocytosis.[5]

Inasmuch as sarcoidosis is usually a self-limited disease characterized by spontaneous remissions, it is difficult to evaluate any form of specific therapy. Recently, it has been reported that cortisone exerts a favorable effect on some of the pulmonary manifestations of the disease.[6,7,8]

Patients who have sarcoidosis that is associated with either symptomatic thrombocytopenic purpura or acquired hemolytic anemia should be managed in the same manner as are other patients with idiopathic thrombocytopenic purpura or idiopathic acquired hemolytic anemia. It would seem logical first to administer a full course of either corticotrophin (ACTH) or cortisone or both, to see whether clinical improvement or remission can be brought about. If there is no significant improvement, splenectomy should be performed. This will be followed by a gratifying response, in a variable percentage of cases, as illustrated by the two cases we have reported.

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BOOK REVIEWS

Roentgen Anatomy, *by David Steel, M.D.,* 1951. *Springfield, Ohio: Chas. C. Thomas, Publisher,* 109 *pages,* $8.

This bilingual atlas of roentgen anatomy provides an interpretive guide to the standard x-ray views of the skeletal system. It consists of 54 plates, the last four of which are devoted to the heart. Each plate is accompanied on the facing page by an accurate outline drawing, numbered to correspond with the English terms below it; the Spanish titles appear beneath the halftone. Such a presentation permits a detailed index to the various shadows on the roentgenograms without the presence of obscuring leaders on the plate itself. To anatomists and others having only occasional contact with roentgenology this volume will be welcome, since it is basic in character and completely self-explanatory. In fact, even the professional roentgenologist should find it helpful in demonstrating to others the normal shadows appearing in the usual x-ray views.

The author has not followed the B.N.A. terminology throughout. In some instances, however, he has given in parentheses older terms that still survive in some quarters. The quality of reproduction is on the whole very good, with excellent range of tones, but there are a few instances, such as the larynx in plate 15, in which details labeled on the outline drawing are indistinguishable on the halftone. As the author indicates in his preface, there is evident room for improvement in techniques of translating photographic detail to the printed page. It is clear that much careful work by an experienced roentgenologist has resulted in an accurate, unique, and very valuable addition to the literature. J.F.H.

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An Introduction to Statistical Analysis, *by Wilfred J. Dixon and Frank J. Massey, Jr. New York: McGraw-Hill Company.* $4.50.

This is a textbook for a general course in statistics, without application to any specialized field. The subject matter is presented in rapid order, so that it would be difficult for the student to get an adequate understanding of the material from study of the book alone.

Although the mathematical formulas used in the book do not require more than the usual knowledge of algebraic addition, subtraction and multiplication, a student would have difficulty understanding them unless he was accustomed to working with the long and complicated formulas used in advanced mathematics courses.

The chapter on IBM machines is a practical addition not often found in books of this type. The tables at the end of the book are much more complete than those included in most statistics textbooks. The problems at the end of each chapter are excellent and must be studied thoroughly by the student who wishes to gain a working knowledge of statistics.

A.W.H.

Surgical Practice of the Lahey Clinic, *by members of the staff of Lahey Clinic, Boston,* 1951. 1014 *pages. Philadelphia: W. B. Saunders Co.* $15.00.

Ten years after the publication of their first volume the Lahey Clinic has again compiled their second volume of Surgical Practices. It presents procedures which by their frequent repetition at the clinic have become standardized operative procedures and thereby made for refinement of operative detail. Many changes in types of surgical procedures are noted, having been conditioned by the use of new antibiotics and antithyroid agents. Many new fields and procedures are illustrated.

There is a section on the new anesthetic methods. I.R.P.

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An Atlas of Normal Radiographic Anatomy, *by Isadore Meschan, M.A., M.D., with the assistance of R. M. F. Farrer-Meschan,* 1951. *Philadelphia: W. B. Saunders' Company.* 593 *pages.* $15.00.

This book was designed especially for four groups of people: the teachers of gross anatomy, to correlate the anatomy of the dead with that of the living; teachers of radiology and teachers of internal medicine in teaching the basic knowledge of the normal as a background for the study of the abnormal and pathologic; and the general practitioner as a ready guide and reference for everyday problems and a more intelligent consultation with the specialist in radiology.

The atlas contains 16 chapters, the first two of which deal with the fundamentals and introduction to radiographic anatomy, the following 14 are devoted to radiographic anatomy of the parts, such as, the study of the brain, the skull, the mediastinum, heart and major blood vessels, and the abdomen and peritoneal space.

There are 1044 illustrations and 362 figures, each figure giving the manner in which the routine projections employed are obtained, the film so obtained, and an interpretation of the film in line, plus many other clarifying illustrations such as venograms, angiograms, and aortograms. The first two chapters are also well-illustrated with diagrams of basic principles. I.R.P.

Planning the Older Years, *edited by Wilma Donahue and Clark Tibbets,* 1951. *Ann Arbor, Michigan: University of Michigan Press,* 248 *pages.* $2.50.

It is most interesting to those engaged in the care of older people to find that the problem of growing old is being recognized by educational groups, and that the approach to the problem is being made from a scientific standpoint.

Planning the Older Years is a collection of papers prepared for a conference program—a conference attended by a group vitally interested in the problems and adjustment of older people. The book is a result of a study inaugurated as a part of an extension program of the University of Michigan. The personnel of the University's Institute for Human Adjustment became interested, resulting in courses of study in gerontology, many conferences, and extensive research.

E.S.J.

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Modern Medication of the Ear, Nose and Throat, *by Noah D. Fabricant, M.D. Twenty illustrations. New York: Grune & Stratton,* 1951. 245 *pages.* $5.75.

This compact and highly readable textbook is "intended to meet the day-by-day requirements of physicians interested in the practical application of medication to the ear, nose and throat." It fulfills this purpose admirably. Dealing with a field which is too often slighted in undergraduate medical courses, it presents necessary anatomical facts, brief historical surveys of methods of treatment, and detailed instructions for the applying of the medicaments suggested.

The book has four sections: *The Ear,* 80 pages divided into six chapters; *The Nose,* 75 pages divided into seven chapters; *The Throat,* 50 pages divided into four chapters; and *The Head,* 27 pages divided into two chapters: "Headache" and "Facial Neuralgias."

The twenty illustrations include pictures of instruments described, cross-sections showing the application of medicaments, anatomical figures and photographs of patients in the positions advised during treatment.

Dr. Fabricant keeps to the subject announced in his title, Modern Medication. He discusses reasons for discarding discredited medicines, warns against indiscriminate use of new medicines which have not justified the claims made for them, and supplies a generous number of prescriptions, sometimes more than one, for the conditions discussed. On the other hand, he does not ignore the necessity of surgery in certain conditions; speaking of abscesses, he concludes, "Nevertheless, when indicated, surgical intervention cannot be replaced by drugs or dalliance."

Each chapter is supplied with an adequate bibliography, and the book has both a good table of contents and an excellent index. C.W.del P.

Lancet Editorial

WE BEGIN OUR 83rd YEAR

In 1870, when Alexander J. Stone, St. Paul, proposed a medical journal there was no professional magazine for nurses or physicians being issued in what is now the Upper Midwest. A few national publications were in existence, some of which were read in this area. In July 1870, the first publication for physicians appeared under the name, *Northwestern Medical and Surgical Journal,* edited by A. J. Stone.

In 1872 the journal was taken over by H. C. Hand, St. Paul, and H. H. Kimball, Minneapolis, who arranged for a new and attractive type face. For a time this journal was discontinued, but reappeared under the name *Northwestern Lancet* in 1881. Five years later it was purchased by A. J. Stone, who 16 years before had originated medical journalism in this area. When the present century opened, W. L. Kline, Minneapolis, was publisher and A. J. Stone was still editor. With Dr. Stone's retirement in 1900, W. A. Jones, Minneapolis, became editor and Mr. Kline was publisher for the next 30 years. In 1912 the name was changed to JOURNAL-LANCET. On retirement of Dr. Jones and Mr. Kline, this journal was purchased by Lancet Publications and a large editorial board was organized. This arrangement has been in effect since 1930.

It is now almost 83 years since this journal first reached the desks of physicians, nearly all of whom were in private practice. No physician practicing at that time is living today. Nevertheless, that group contributed significantly to the progress of medicine, as has been done by each subsequent generation of physicians. Clinics as we know them today were not in existence. There was no state board of health in this entire area. In fact, in the United States, only Massachusetts and California had such boards. William Worrell Mayo had been practicing in Rochester only seven years. His son, William James, was nine years old and Charles Horace was five. It was not until ten years after JOURNAL-LANCET first appeared that a school granting medical degrees was opened and eight more years before a teaching faculty in medicine was appointed at the University of Minnesota.

During the 83 years of JOURNAL-LANCET's existence there have appeared in the Upper Midwest boards of health in each state, as well as fine university schools of medicine. State medical associations have been organized or reorganized, and numerous local medical societies have come into being. The world's most outstanding and renowned center for practice of medicine and research was established and perfected by the Mayos at Rochester. Numerous excellent group clinics came into being in the large and small cities alike. Individual practitioners, including those located in rural areas, became trustworthy family physicians with keen diagnostic acumen and employing the most modern methods of treatment and prevention of disease.

For the allayment of suffering, restoration of health and protection of the public, hospitals were provided as needed for every situation, including special groups such as crippled children, the tuberculous and the mentally ill.

Postgraduate medical education was developed, so physicians became experts in all the medical and surgical specialties. Continuation study centers became available, where practicing physicians were able to enroll for short courses to be informed of the latest developments in all phases of medicine and surgery.

During the period since 1870, the science of bacteriology was born and specific organisms for numerous diseases were identified, beginning with the bacillus of leprosy in 1874. The x-ray was discovered in 1896 and the bronchoscope two years later.

Immunizing agents for such diseases as diphtheria and typhoid fever were made effective. Drugs were produced which proved satisfactory for the treatment of syphilis and then for a host of infections. The sulfonamides and later the antibiotics probably increased the span of human life at least 10 years.

Surgery has caused the blind to see, previously hopeless cripples to walk, some of the mentally ill to be restored to reasonably good mental capacity. The abdomen, the chest and the heart have yielded up their secrets to surgeons. Surgical techniques and anesthesiology have been devised and perfected so that tremendous numbers of people doomed to almost immediate or early death have been relieved of these fatal conditions and have lived or are living out their normal spans of life.

In 1870 the average length of life in the United States was about 40 years. In 1900 it was 48 years. In 1951 it was closely approaching 70. In all history on the entire surface of the earth there has never been a system of medicine that even remotely approached such accomplishments.

Veterinarians and their allies played an unparalleled role in controlling and eradicating diseases in domestic animals transmissible to man. No small share of the increased span of human life belongs to them.

Dentists and their allies, particularly dental hygienists, have developed and perfected procedures which have contributed signficantly not only to improved nutrition, but also to more comfortable and longer living. For example, pulmonary abscess, a prevalent and often fatal condition, has become relatively rare. Dentists and their allies through their teaching and practice deserve much credit for this accomplishment.

To all of this and more, JOURNAL-LANCET has made significant contributions. It has served as a medium

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through which physicians and their allies have transmitted discoveries and procedures to others. It has supported research, medical education in all of its phases, state board of health activities and medical organizations. It has been the first official publication of a number of state medical associations. From it, some of these organizations took their start and have developed their own fine state medical journals.

JOURNAL-LANCET remains the official publication of the strong and progressive State Association of North Dakota as well as numerous special societies in the Upper Midwest and the American College Health Association.

A new department was established in 1951 under the heading, *Medical Science Reviews*, in the interest of continuing medical education. This is devoted to authoritative reviews of important progress in scientific medicine, both in the fundamental and clinical fields.

Another new department appears in this January 1952 issue under the heading, *Lancet Clinical Reviews*. Reports similar to those in this issue are scheduled to appear regularly.

The editorial board and publishers plan to maintain the high standards of JOURNAL-LANCET and they welcome papers, case reports and other material on all phases of medicine and surgery which will provide its readers with the most authentic and latest information.

J. A. MYERS, M.D.,
Chairman, Board of Editors

Notices . . .

George Chase Christian Lecture

Professor C. H. Andrewes, National Institute for Medical Research, University of Leeds, London, England, will give the annual George Chas Christian Cancer Lecture at the University of Minnesota medical school, Minneapolis, on the evening of Tuesday, January 15, 1952. His subject will be "Current Thoughts on Viruses and Cancer."

★

University of Minnesota Postgraduate Courses

A continuation course on *Therapy of Cardiovascular Diseases* will be presented at the Center for Continuation Study Feburay 14 to 16. Dr. Charles P. Bailey, professor of surgery, Hahnemann Medical College, Philadelphia, will be the visiting faculty member for the course. He will also give the annual Phi Delta Epsilon Lecture on the evening of Thursday, February 14. His subject will be "Recent Advances and Future Trends in Cardiovascular Surgery."

A course in *X-Ray for General Physicians* will be presented at the Continuation Center on March 3 to 5, under the direction of Dr. Leo G. Rigler, professor and head of the department of radiology. Special emphasis will be placed on x-ray techniques, x-ray diagnosis of fractures, other bone lesions and pulmonary lesions. In addition to lectures on these subjects, practical demonstrations will be held. The registrants for the course will be invited to bring their own films to the course for discussion.

Dermatology will be the subject of a continuation course to be presented February 28 to March 1. Dr. Arthur C. Curtis, professor and chairman of the department of dermatology, University of Michigan, will be the visiting faculty member. The course will be presented under the direction of Dr. Henry E. Michelson, chairman of the division of dermatology at the University of Minnesota.

News Briefs . . .

North Dakota

DR. DANIEL C. DARROW, a native of Fargo, recently received the Borden award of the American Academy of Pediatrics at ceremonies in Toronto. The award is given each year to the physician who has done the most outstanding work in the study of children's diseases. Dr. Darrow has concentrated mainly in the study of water and electrolyte metabolism, and has demonstrated the successful use of potassium in the treatment of infant diarrhea. The son of a pioneer Fargo physician, Dr. Darrow attended North Dakota agricultural college before later study at Cornell and Johns Hopkins university.

* * *

THE GIFT of four acres of land by John Dekrey, Jr., a North Dakota farmer, has made it possible to recognize the act of an army surgeon, Dr. Josiah S. Weiser who sacrificed his life in a battle between troopers and Indians in the coteaus near Tappen, N. D., in 1863. The surgeon is buried on Dekrey's land, 8 miles northeast of Tappen. The State Historical society and the North Dakota Medical association are cooperating in the surveying, fencing and marking of the historical site.

* * *

DR. ROBERT BRANDENBURG, a native of Bismarck, has accepted a position as consultant in medicine in the section on cardiology at the Mayo clinic. Dr. Brandenburg was graduated from the North Dakota Agricultural college and the University of North Dakota before receiving his medical degree from the University of Pennsylvania in Philadelphia.

* * *

DR. ANDRE HUNT LAMAL, formerly of Ashland, Wisconsin, has established a practice at Watford City. Dr. Lamal was graduated from Marquette University medical college, and took graduate work in Edinburgh, Scotland.

* * *

DR. V. A. MULLIGAN, Dr. I. L. Lazareck, and Dr. A. D. Strom are moving their offices into a new medical building in Langdon.

Minnesota

THE BOARD OF TRUSTEES of the Minnesota Medical Foundation elected officers at its recent meeting. Dr. Owen H. Wangensteen, professor and head of the department of surgery, was reelected as president. Dr. Francis W. Lynch, clinical professor of the department of dermatology, of St. Paul, was elected vice-president. He succeeds Dr. W. W. Will who retired from the Board after serving continuously since the organization of the Foundation. Doctors J. Richard Aurelius, St. Paul, Charles G. Sheppard, Hutchinson, and R. S. Ylvisaker, Minneapolis, newly elected members of the Board, participated in the meeting as active members of

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the Board. They were elected at the annual meeting of the Foundation on October 4.

* * *

New officers of the Ramsey County Medical society, elected at the meeting on November 26, are: Dr. J. P. Maldelman, president; Dr. Laurence Hilger, secretary and treasurer; and Dr. P. F. Donahue, president-elect for 1953.

* * *

John M. Glendenning, Detroit, Mchigan, has assumed his new position as co-ordinator for Glen Lake sanatorium. He will handle educational guidance, supervision of training during treatment, advice and assistance in selecting suitable vocations for patients in need of a new vocation and assistance in placement.

* * *

On December 12 the Minneapolis Veterans hospital opened two new research laboratories: a radio-isotope laboratory, where studies will be made with radio-active materials from Oak Ridge, Tennessee, and a surgical research laboratory, for experiments in surgery and physiology, development of new methods and training. Each laboratory occupies a floor in a newly converted wing of the hospital. Together they represent a $180,000 installation.

Dr. Leslie Zieve will direct the radio-isotope laboratory and Dr. Frederick M. Owens, the surgical laboratory. Dr. Herbert S. Wells is the hospital's over-all director of research and clinical laboratories, and Dr. Richard V. Ebert, research committee chairman.

Dr. Gaylord W. Anderson, director of the University of Minnesota school of public health, is new president of the American Public Health association. He was inaugurated at the group's annual meeting in San Francisco.

* * *

Dr. Ralph T. Knight, anesthesiology director in the university medical school, was named president-elect of the American Society of Anesthesiologists in Washington.

South Dakota

Dr. T. J. Billion, Sr., of Sioux Falls, was honored November 14 during a McKennan hospital staff clinic day, when he was presented a 50-year membership by the South Dakota Medical association. According to records of the association, Dr. Billion is the thirteenth member of the group to receive the award. Dr. Billion began his practice in Sioux Falls in May, 1901, shortly after his graduation from Creighton university medical school.

* * *

Dr. H. Russell Brown, Watertown, was elected president of the North Central Conference at their meeting in Minneapolis on November 12.

Wisconsin

December 4 was designated "Dr. Lundmark day" by the citizens of Ladysmith in honor of Dr. Lambert M. Lundmark, pioneer Rusk county physician. More than a thousand persons participated in the community festivities.

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COMPOSITION (each 2 fl.oz. daily dosage contains):
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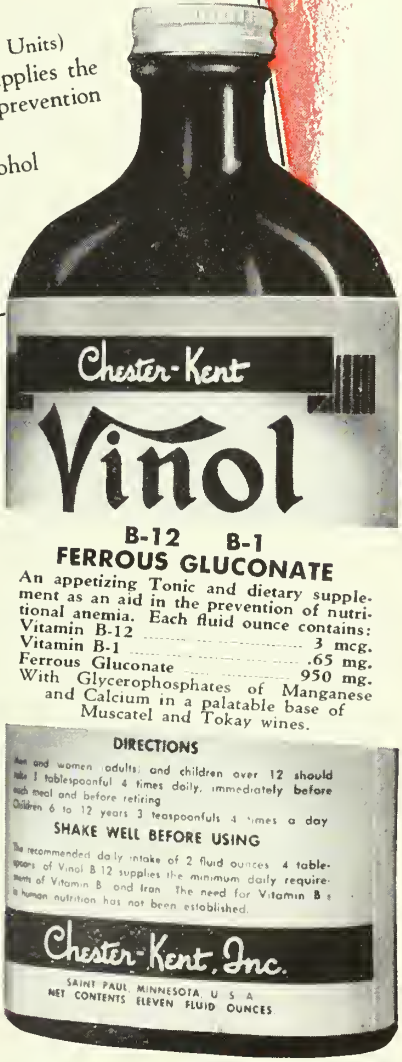

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A newly created council on medical service of the Wisconsin Medical society will carry out a program to assure the public of the state of the "Availability of medical service at all times. The nine member council proposes:

1. A survey to determine what communities do not yet have well established physician's exchange or emergency telephone answering services.

2. Preparation of a manual of instructions for the organization of such exchanges and services, for the guidance of county medical societies.

3. A public education campaign designed to create better understanding of how and when to call a physician.

4. A physician and physician's secretary education program to help doctors eliminate unnecessary night and emergency calls.

* * *

THE new University of Wisconsin Easter Seal Cerebral Palsy center will open January 2. A grant of $45,000 from the Wisconsin Association for the Disabled provides $15,000 a year for three years to support the center, which will be located in the Orthopedic hospital of the University of Wisconsin medical campus.

The center will offer a coordinated program of examination, evaluation, treatment, occupational and physical therapy, and after care through its out-patient and hospital facilities. A training program for parents will also be offered to help parents care for children after they return home.

Deaths . . .

DR. ALFRED W. ADSON, 64, neurosurgeon of the Mayo Clinic at Rochester, died on November 12. He was born at Terril, Iowa, and had been associated with the Mayo staff since 1914.

★

DR. L. DOUGLAS CAMPBELL, 38, surgeon at New Richmond, Wisconsin, was killed November 12 in a train crash near Evanston, Wyoming. Dr. Campbell was a graduate of Northwestern university medical school and had practiced in New Richmond since 1947. He was president of the Pierce-St. Croix County Medical society at the time of his death.

★

DR. EDWARD MADISON RANSOM, 69, of Minot, North Dakota, died November 17. A graduate of the University of Minnesota medical school in 1904, Dr. Ransom had practiced in Minot since 1907, and had been associated with the Northwest clinic since it was founded in 1928.

★

DR. ROBERT GAMBLE, 72, who had practiced at Madrid, Iowa, for the past 33 years, died on November 22. A graduate of the former St. Louis Physicians and Surgeons college, Dr. Gamble had practiced 11 years in Atlantic before coming to Madrid.

★

DR. FRANK EARL BELLINGER, 77, Council Bluffs, Iowa, died on November 22. A graduate in 1900 from the Creighton University medical school, he was on the staff of Jennie Edmundson hospital until his death. He completed 50 years of medical practice in 1950.

★

DR. WILLIAM R. ARTHUR, 73, who had practiced medicine in Hampton since 1912, died on November 28. A graduate of the University of Iowa medical school in 1907, Dr. Arthur had practiced first at Greene, coming to Hampton in 1912.

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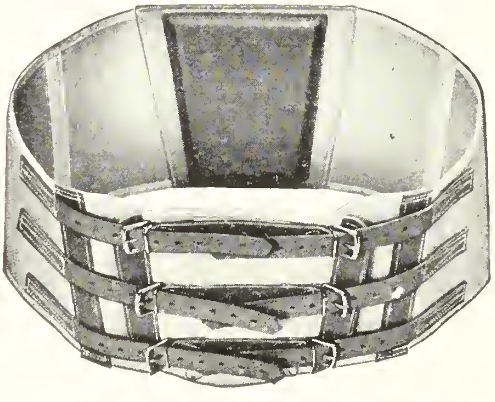

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Three informative papers have been published in scientific journals concerning treatment of peripheral-vascular diseases with nitroglycerine ointment. The first, in Acta Medica Scandinavica, a compendium of European medical research, published in 1946 and available in the United States late in 1948, is the report of Dr. Fredrik Lund of Sweden covering investigations begun in 1944. Another published in the September, 1948, issue of Wisconsin State Medical Journal, is the work of Dr. Max J. Fox of Milwaukee. In this first report of the successful use of nitroglycerine ointment by an American scientist, Fox details his work with Raynaud's Disease beginning in 1947 and evaluated up to date of writing over a year later. Reviewed in the Journal of the American Medical Association, January 29, 1949, Dr. Fox's article has led to the use and further investigation in various other peripheral-vascular diseases by other prominent American scientists. In the November 22nd, 1950, issue of the Proceedings of the Staff Meetings of the Mayo Clinic, a 66⅔% positive effect in Raynaud's Disease is recorded.

From Fox, Lund and others, it may be noted that despite the differences of opinion regarding Raynaud's Disease and other peripheral-vascular diseases, most investigators believe a local vasodilatation to be of desirable therapeutic value. NITROGLAN should be tried before surgery.

It may be said that, until the present development of NITROGLAN, no consistent means of accomplishing local vasodilatation had been found, but the use of NITROGLAN, topically, has been encouraging and beneficial, and when the condition is reversible may lead to permanent favorable results with continued use. NITROGLAN is a local treatment, requires no laboratory control, the schedule is simple, application is easy, the side effects easily tolerated.

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American College Health Association News . . .

Dr. Ruth Boynton, director of the student Health Service at the University of Minnesota, has returned from extended study abroad on a Fullbright scholarship.

* * *

A paper on "Medical Supervision of Boxing" presented by Dr. L. B. Chenoweth, director, Student Health Service, University of Cincinnati, at the 27th annual meeting of the Ohio College Health Association was published in the *Ohio State Medical Journal* in October.

* * *

Elizabeth Veeder, M.D., is director of Student Health at Skidmore College, Saratoga Springs, New York.

* * *

Dr. A. O. DeWeese, director of the Student Health Service at Kent State University, has been honored by three organizations for contributions to the profession of public health and medicine. The Ohio Public Health Association recently presented him with a Certificate of Honor for "25 years of meritorious service to the citizens of Ohio in the field of public health." His alma mater, the University of Louisville, honored him with a similar citation. A meritorious award was given by the Ohio Association for Health and Physical Education for "outstanding work in the field of health and physical education in the state of Ohio."

* * *

Dr. R. W. Bradshaw, director of Health Service for Southern Illinois University, delivered the keynote address at the meeting of the Illinois Statewide Public Health Committee held in October in Murphysboro at the Jackson County Department of Public Health.

* * *

The Mid-Atlantic Section met at the University of Richmond, Richmond, Virginia, on December 7. According to the preliminary program which was sent to us by the president of the Section, Dr. Frank R. Smith of Johns Hopkins University, topics presented were: The Value of the Routine Physical Examinations, Recognition and Care of Cardiac Impairments Among College Students, Skin Diseases in the College Population, and B_{12} and Other Drugs in the Treatment of Anemia and Leukemia.

* * *

The Pacific Coast Section held its annual meeting on December 7 and 8 at Occidental College, Los Angeles, California. The program on Friday included a variety of topics of particular interest and value to college physicians, such as: Influenza, Ear, Nose and Throat Practice, the Dental Program, and Psychiatric Problems. Reports of two surveys were given: A Tuberculin, Histoplasim, and Coccidioidin Survey, and a Diabetic Survey. "Some Phases of Legal Medicine of Special Interest to College Health Service" and "Radiation Hazards and Radiation Safety Measures in Colleges" were other interesting presentations.

On Saturday morning the nurse and the health educator had an opportunity to present some needs in their respective fields. Emphasis was placed on the contributions of the health service staff to the health education of college students.

Stanford University, located in Palo Alto, California, was selected for the next annual meeting. The new president, Dr. George Houck, is the director of Health Service at Stanford University. Other elected officers were: president-elect, Gilbert Coltrin, M.D., director of Student Health, The Associated Colleges at Claremont; secretary-treasurer, Catherine Wallace, San Jose State College; and member-at-large for a two-year term, Paul Greeley, M.D., University of Southern California.

Fifty-three people attended the meeting, representing twenty-seven institutions.

* * *

Lewis Barbato, M.D., of the University of Denver, is the new chairman of the *Mental Hygiene Committee*. Other members of the committee are: Dana Farnsworth, M.D., Massachusetts Institute of Technology; Clement Fry, M.D., Yale University; Vernon E. Keye, Wayne University; Annette Washburne, M.D., University of Wisconsin; Bryant Wedge, M.D., University of Chicago.

PROLONGED LABOR

(Continued from page 14)

an answer to all obstetric problems and should be definitely warranted before seriously considered.

Summary

1. The management of prolonged labor represents a test of obstetric judgment.
2. Fundamental obstetrics principles should not be ignored.
3. Careful observation of the patient during the course of labor and accurate evaluation of the factors involved is essential.
4. Consultation with the obstetric specialist under such circumstances is good judgment and not an admission of failure.

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Intensive Course in Surgical Technic. Two Weeks, starting January 21, February 4, February 18.
Surgical Technic, Surgical Anatomy and Clinical Surgery, Four Weeks, starting March 3, June 2.
Surgical Anatomy and Clinical Surgery, Two Weeks, starting March 17, June 16.
Surgery of Colon and Rectum, One Week, starting March 3, April 7.
Gallbladder Surgery, Ten Hours, starting April 21.
Basic Principles in General Surgery, Two Weeks, starting March 31.
Breast and Thyroid Surgery, One Week, starting June 23.
Esophageal Surgery, One Week, starting June 23.
Thoracic Surgery, One Week, starting June 2.
Fractures and Traumatic Surgery, Two Weeks, starting February 4.
GYNECOLOGY—
Intensive Course, Two Weeks, starting February 18, March 17.
Vaginal Approach to Pelvic Surgery, One Week, starting March 3, March 31.
OBSTETRICS — Intensive Course, Two Weeks, starting March 3, March 31.
MEDICINE—
Intensive General Course, Two Weeks, starting May 5.
Electrocardiography and Heart Disease, Two Weeks, starting March 17.
Gastroenterology, Two Weeks, starting May 19.
Hematology, One Week, starting June 16.
UROLOGY—
Intensive Course, Two Weeks, starting April 28.
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CLINICAL USE OF THE ARTIFICIAL KIDNEY

(Continued from page 7)

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Wanted: Young internist with Board qualifications, well established six man clinic in central North Dakota city. Unusual opportunity for early partnership. Also excellent opportunity in EENT. Write box 925, care of Journal-Lancet.

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Wanted: American physician at North Dakota State Hospital. Experience in psychiatry desired but not essential. Write Superintendent, Jamestown, North Dakota.

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SERVING THE MEDICAL PROFESSION OF MINNESOTA,
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FOREWORD . . . .

When I was asked to become guest editor for this February 1952 issue of The Journal-Lancet, the subject was to be "pain-relieving drugs." I asked that this subject be changed to the problem of pain.

I suppose that roughly half of the patients who come to the physician for medical attention complain of distress in one form or another. There is, at present, no accepted definition of pain, but whatever the real nature of pain, whether it is organic or psychogenic in origin, we are compelled to do something about it.

Over the arch in the old amphitheater at Rush Medical College was the pronouncement of an objective for the medical student, "Prolongation of Life and Relief of Suffering."

JOHN S. LUNDY, M.D.

Many books have been written on this subject, and many of them are enumerated in this journal by Mr. Keys, the author of *The History of Surgical Anesthesia.* As Balme has said in the preface to the first edition of his book, *The Relief of Pain,* "I have purposely avoided all but a passing reference to the greatest contribution which has yet been made to the conquest of pain, namely, general anesthesia."

There are many cases in which pains of distress can be relieved, as is illustrated by the terrific abdominal pain of spasm of the sphincter of Oddi called "postcholecystectomy syndrome" which occurs after morphine has been administered. It is of considerable interest that the pain may be relieved in a half minute by the intravenous injection of 3 grains of sodium nitrite. In this instance the procedure is not only diagnostic but it also gives immediate relief.

There are patients who suffer from advanced carcinoma, but who become much nauseated when given pain-relieving drugs such as morphine. Some means must be found to control this nausea. One of the usually, but not always, effective ways to accomplish this is to administer Hyatrobal, a preparation of hyoscine, atropine and pentobarbital, thirty minutes prior to the administration of morphine. Such a technic usually allows the patient to accept morphine with very little if any nausea.

Naturally, I feel it desirable to include in this issue the subject of anesthesia. Drs. Knight and Pender have contributed papers on this subject. There are many viewpoints from which pain must be considered. One desirable viewpoint would be where a cause can be discovered and treated. Too often the cause cannot be discovered, and then the physician must treat a symptom, definitely and sometimes psychiatrically. Not infrequently both approaches must be employed.

In this issue of The Journal-Lancet an attempt has been made to sample each of these points of view. It is with hopeful anticipation that communications are invited concerning this issue and the possibility of a regular or irregular continuation of this effort, to some degree, in future issues of The Journal-Lancet.

John S. Lundy, M.D., *Guest Editor*

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BOSTON

Pain as a Psychiatric Problem

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The observations made on patients treated for intractable pain by prefrontal lobotomy have confirmed an impression long held in psychiatry that pain is not a simple percept but has significance as an emotional experience.[1,2] If a patient with a painful cancerous lesion is treated by prefrontal lobotomy his complaints of pain largely subside and he may no longer require analgesics, although if he is questioned he will often state that he feels pain. Yet, when he is examined neurologically, it will be found that he perceives the ordinary painful stimulus of a pinprick with as much sensitivity as those who have not undergone such a surgical procedure. Also it has been observed that if one now makes some inquiry on a subject which has been a source of anxiety in the personal life of this cancerous patient, the patient who has undergone prefrontal lobotomy may respond by complaining again of pain. In other words, the prefrontal lobotomy has led to a separation of the emotional significance, the anguish or dread of future painful impressions, from the actual perception of the painful stimulus.

It was pointed out many years ago[3] that most hysterical pains have their origin in conjunction with an organically determined painful sensation to which the patient attaches by association a painful psychic impression which has occurred more or less simultaneously with the physical stimulus for pain. In other words, the complaint of pain has become a symbol for an associated painful emotional state.

It is not enough to state that pain may occur as an expression of an emotional disturbance or as a sign of anxiety. The question must be raised as to the manner in which pain may take on such significance. Briefly, the symptomatology of emotional disorders (neurosis or psychosis) is currently explained in the following manner. When the individual patient is confronted with some conflict between his inner drives and his personal and cultural standards which he is unable to resolve realistically, he may adopt (regress to) some form of childish or infantile behavior which in his fantasies gave him satisfaction in the past. The primary symptoms of the neurosis thus represent the reappearance of such immature behavior patterns.

Painful symptoms in any portion of the body may occur as regressive phenomena in the face of such a neurotic conflict. We may understand how pain serves as a source of satisfaction only by considering those events and thought processes in the lives of children which give this perception emotional significance as the children experience it themselves and see it experienced in others.

Probably the commonest painful experiences of the child are the suffering of simple injuries such as bumps or falls about his home. He soon learns, in most families, that his cries of pain are rewarded by some display of tenderness on the part of his mother or those about him. In other families, the reverse is occasionally true. In time, the child runs to his parents when he is hurt or injured for the comforting he may receive. In some families in which the mother is over-conscientious and protective, the child's slightest complaint is attended by extreme solicitude. Such conditioning to pain may determine that later in life this child will regress when frustrated and obtain, by complaining of pain, the solicitude he desires from others, including his physicians, in order to allay his anxiety.

Another type of infantile and childhood experiencing of pain and illness occurs when the child observes the solicitude of his parents in the care of a severely or chronically ill brother or sister. In this instance, in envy of the sibling, the child may exhibit fantasy suffering in a similar manner in order to obtain the longed-for affection that is bestowed on the sibling. In adult life, following some pain-inducing lesion, his symptoms may be protracted for prolonged periods with the unconscious wish to obtain the gratification for which he envied his sibling.

Another variety of psychological experience which may determine the development of a painful complaint on psychogenic grounds is illustrated well by certain patients with a chronic painful phantom limb. It appears, from some recent studies, that civilian amputees who develop a painful phantom limb are frequently predisposed through an early association with another amputee. It is probable that a close and continuing association with an amputee arouses anxiety-producing fantasies in regard to personal mutilation. Such fantasies are mastered by repression. These fantasies may be relighted by threat of a similar surgical procedure, and then become the source of the pain complaint and panic which ensue in the postoperative state. In other words, the new amputee identifies himself with the amputee he has known in the past. Indeed, of nine civilian patients with painful phantom limbs on whom my colleagues and I obtained adequate histories, six gave information indicating a close and significant emotional attachment to another amputee in the past.[4] Pain as a complaint to solve a dependent need or to express anxiety associated with fears of self-mutilation through identification with another is most commonly encountered in persons of hysterical character.

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Masochistic self-punishment is a well-known psychiatric clinical phenomenon which underlies many chronic painful conditions. One of the ways in which a child may come to use pain as a punishing symptom has been stated to take place in the following manner.[5] The child who is envious of his brother or sister may have the opportunity of observing one of his parents punish his sibling. He secretly takes pleasure in the punishment of his rival for the parent's affection. However, because of the guilt that he feels for his enjoyment, in fantasy he punishes himself by substituting himself for the other child and imagines the pain that his sibling feels. The overconscientious person brought up to repress such hateful emotions may complain of pain when confronted by hostile emotions directed toward some close associate which he dare not indulge.

This guilty response for hostile feelings toward others, if extreme and persistent and aroused in a person with a rigid perfectionistic character, is often associated with other symptoms which are recognizable as expressive of an obsessive-compulsive neurosis or a depression.

Finally, no consideration of psychogenic pain is complete without mention of the complication of drug dependency or addiction. In addition to the psychologic needs of the patient expressed in his pain symptom, the long-continued use of a narcotic adds a physiological dependency through the development of addiction. With the occurence of addiction the patient complains of pain in order to obtain the gratification provided by the drug and prevent the development of the unpleasant symptoms which occur with any abstinence from its use.

Although the life experiences mentioned before will be found to underlie the development of a psychogenically determined pain complaint if one studies the patient over a sufficient length of time, it is seldom that these experiences are revealed in their full detail or significance during initial diagnostic examinations. The psychiatrist, who is required to express a diagnostic opinion as to whether psychic factors are operative in producing or maintaining pain, most often does so by the use of the conventional technic of obtaining a detailed account of the patient's illness and his developmental history with emphasis placed on the interpersonal experiences of the individual under study. In contrast to the internist and neurologist, who focus on the interpretation of symptoms by correlation with other symptoms that indicate a disturbance of function in some organ or system, the psychiatrist is particularly interested in defects in the patient's social and emotional functioning as indications of stress and inability to adapt to his external environment.

In the case of the patient's description of his painful illness the knowledge that some emotional disturbance is associated in time with the onset or recurrences of his painful complaint is suggestive that psychic processes are operative in its maintenance. Most frequently such events will be found to be the death or separation from a parent, spouse, or lover, difficulties in relations with an employer or some parental figure, or threat of illness. Consequently, in taking the history it is necessary to identify not only the members of the patient's immediate family but also his important personal contacts in his business, social and sexual life, and determine the state of those relations at the time when his complaint became evident and extending to the present. In other words, a systematic exploration of the patient's human relations is made in order to identify possible sources of anxiety. In the course of such a psychiatric examination of the type described, the hysterical patient with psychogenic pain not infrequently will voice his complaint loudly when the examiner questions him on the emotionally disturbing relationship. This behavior is in marked contrast to his customary seeming indifference to his symptom although he describes it with much vividness.

It has been my experience to examine patients who complain of suffering from intractable headache, backache, atypical facial pains, pain in phantom extremities and other parts who seemed entirely undisturbed by their symptoms, but who suddenly complain and grasp at the affected part when the interview has finally focused on their important conflicting personal relationship. At such a time, if the examiner is not distracted by the symptom and pushes on with further inquiries, it is common to obtain a clear description of the conflict occurring between the patient and the person of importance to him who has come under discussion. For instance, although one patient with a painful phantom limb complained of persistent pain, it was noted that he was at ease and without discomfort throughout the interview except when certain emotionally disturbing subjects were discussed. These were: the reaction of his wife to the disfigurement, his fear that she might leave him, the loss of his first wife who had deserted him, and a recent illness of his mother. When these topics were introduced into the discussion, the patient complained of having pain. Such reactions occurred repeatedly; the introduction of these topics, psychologically painful to him, led him to void his symptoms.

Not all patients with pain of psychic origin have the intermittent attacks of pain which may be induced through discussing the appropriate anxiety-laden topics. Others, notably those in whom the pain represents one of the symptoms of an obsessive neurosis, a hypochondriacal state or a depression, complain of a more or less persistent symptom. In such instances, the psychic conflict is less easily identified.

It is important to determine the type of emotional disturbance from which the patient suffers, since the appropriate treatment for this condition will also prove the correct therapy for the painful symptom accompanying the illness. In fact, many of the present failures in treatment of chronic painful conditions associated with emotional disturbances are due to the failure to evaluate correctly the personality disturbance of the patient and the factors underlying the illness, and then to decide on the type of therapy warranted by that condition. A large number of patients with a hysterical painful complaint have come for treatment after an unsuccessful trial of electroshock therapy. Electroshock therapy is not indicated in the treatment of the hysterical neuroses, whereas it often is helpful in treatment of the depressive reactions.

In general, it may be expected that the patient's complaint is psychogenically determined when there are no signs of physical disease or the symptom has persisted long past the usual period of subsidence of a known acute illness or physical injury, when the symptom either is not relieved or is aggravated with the use of analgesics, when the symptom is relieved with the use of sedatives and hypnotics, when the patient appears indifferent to his symptom, when the pain is precipitated or aggravated by discussion of topics emotionally distressing to him, when it is relieved by intensive medical and nursing care which satisfies the patient's dependent needs, when the symptom is associated with character traits or symptoms indicative of a neurotic or psychotic disturbance, and when there is evidence from the patient's developmental history that he has undergone life experiences known to be productive of such illnesses.

In contrast, patients with pain due to physical disease usually describe their symptoms precisely, signs of physical disease are commonly evident, analgesics provide either some or much relief, and the patient appears to be suffering and demonstrates a limitation of his actions consistent with the pain that he indicates he perceives. While such a patient may give a history suggestive of an emotional disturbance, more often such a history is not obtained.

Early treatment of the painful complaint due to emotional disturbances is important. The earlier such treatment is instituted, the more likely that the condition may be modified by simple psychotherapeutic measures which do not have the disadvantage of the somatic psychiatric therapies such as electroshock and prefrontal lobotomy. Resolution of the painful symptom or its conversion into some other symptom is to be sought in all cases, since the patient with a chronic painful complaint is likely to be exposed to the danger of narcotic addiction and treated in such a manner that he may become totally dependent and disabled. The following case illustrates psychotherapeutic treatment of an acutely determined pain of emotional origin.

Case 1. This patient, a 14-year-old boy, came to the Mayo Clinic complaining of a "knot in his leg." He stated that he had bumped his right lower leg against a step one month previously. The leg had remained swollen and painful following the injury.

On examination a hard, fixed, tender mass was noted on the middle third of the right lower leg. A roentgenogram showed a primary malignant bone tumor involving the anterolateral cortex of the right tibia. Three days later, amputation of the right leg was performed through the lower third of the femur. The pathologist reported an osteogenic sarcoma of the tibia. The patient complained of pain in the phantom right leg shortly after recovery from the anesthesia. Within two days after operation large doses of narcotics were employed in an attempt to relieve his painful symptom. The symptom increased in severity in spite of the additional prescription of barbiturate medication. By the ninth postoperative day the patient was crying bitterly of a burning pain, was overactive, thrashed about in bed and spoke of jumping out of a window. Special nursing was required. At this time psychiatric consultation was requested. The patient was found fearful, disoriented and confused. Drugs were withdrawn, with the exception of morphine, in order to alleviate the mild toxic delirious state.

On the following day the patient was rolling about in his bed, with eyes closed, apparently oblivious to those about him. He cried out repetitiously, "Help me, help me, do something for the pain." Because of our belief that frightening rationalizations as to the origin of the phantom limb contributed in part to the state of painful panic, we inquired if he were aware of the occurrence of phantom feeling after operation. Surprisingly, the boy immediately became silent, opened his eyes and responded affirmatively. With questioning he declared that a year previously his schoolteacher had casually discussed amputation with his class. The teacher told the class the story of a man who had an amputation and then developed a severe stinging pain in his phantom limb. Nothing was found to relieve the pain in this phantom. Eventually it was recounted that the man was informed that if his amputated leg were disinterred the cause for his pain would be found. This was done. Ants were discovered burrowing into and stinging the amputated part, and his pain ceased when the ants were removed and the leg carefully reburied.

When inquiry was made as to what disposition the boy believed had been made of his own amputated extremity he stated that he thought "it was being burnt." He was reassured and informed otherwise. The painful complaint and his wild overactivity subsided to a large extent immediately following this interview. It was possible to withdraw all morphine within twenty-four hours and dismiss his special nurses shortly thereafter.

However, complete relief of his painful complaint required treatment over four additional psychotherapeutic hours. During the next interview he again complained of pain and grasped his stump when he was brought to discuss his mother. It was learned that the boy had been severely upset by her death from cancer of the breast five years previously. She had undergone amputation of the breast for this condition. He had never spoken of his mother since her death but was morbidly inquisitive whenever anyone became ill and would inquire of his father if the person was about to die. In the subsequent hours he expressed certain resentful feelings about his mother, father and others. He described his anger toward his mother for her frequent physical abuse of him, his anxiety when she left their home from time to time after arguments and his guilty feeling that an accidental blow on her breast with a rake by him had led to her death. Thus, the latter four hours of treatment brought to awareness the boy's repressed hostility toward his mother, with whom he identified as regards his amputation, and his ambivalent feelings toward his father.

At dismissal he had no pain, was up and active on crutches, and was eager to have a prosthesis fitted. A year later his stepmother wrote that he remained without pain, was wearing a prosthesis, and had returned to school, where his studies were proceeding well and where he had been elected to a class office.

Once the emotionally maintained painful symptom has become chronic, the problem of its treatment and management is complex and often unrewarding. In addition to the initial unresolved emotional conflict one has to treat often a profoundly regressed, dependent and inactive person who may also be suffering from a narcotic addiction in addition to some physical disease.

In such instances, hospital treatment is indicated. With a predominantly hysterical or anxious person suffering from pain, psychotherapy combined with a program of active rehabilitation may bring relief. In other instances, in which the patient is suffering from a severe depression, electroshock has proved effective.[6]

Although prefrontal lobotomy may be advised for the treatment of chronic painful conditions, it is now recognized that many patients make an unsatisfactory social adjustment following this procedure. Prefrontal lobotomy may be considered for those patients in whom the painful complaint represents a part of a severe obsessive-compulsion neurosis or a psychotic state when these conditions have proved refractory to conservative treatment such as psychotherapy or electroshock therapy. It is not indicated for patients with hysterical or traumatic neurosis, in whom the symptoms are frequently intermittent and seldom entirely incompatible with a reasonable social adjustment. Nor is the procedure recommended in the psychoneurotic depressive states or obsessive states when the patient is able to carry an important responsibility in business or at home in spite of his pain and in spite of narcotic addiction. The procedure is also inadvisable when the patient is managing successfully outside the hospital but is an isolate, without relatives or friends, since the operative procedure may lead to such a severe reduction in productive capacity and increase in dependence that institutionalization might be necessary.

It has been found that unilateral lobotomy and transorbital lobotomy are not as effective in the treatment of pain affecting the emotionally disturbed as bilateral prefrontal lobotomy. This is true, also, of emotionally disturbed patients with pain due to cancer who are to be treated by lobotomy. Therefore, such patients should have psychiatric study prior to operation in order that the appropriate type of procedure may be selected.[1,7,8]

The following case report demonstrates the use of prefrontal lobotomy in the treatment of a painful hallucination.

Case 2. A 41-year-old married woman came to the clinic with the complaint of persistent pain of four years' duration localized in the perineal region and particularly in the region of the clitoris and the vaginal introitus. The symptom had had its origin shortly after her husband returned from the army. She had attempted to relieve this painful sensation by demanding sexual activity and resorting to masturbation, but without success. With increasing guilt, she became depressed and suicidal. Three years ago, she was hospitalized elsewhere and treated with electroshock therapy. Following the first treatment, the patient jumped from a porch in a suicidal attempt, and sustained a compression fracture of the first lumbar vertebra with a crush injury of the cauda equina. Her depression and the pain subsided but recurred again six and eight months later. On each occasion a course of electroshock therapy brought only temporary relief from the pain. It was not possible to maintain her at home because of her behavior disorder.

On admission to the clinic, neurologic examination demonstrated the residual defects in the lower extremities subsequent to the injury of the cauda equina. She walked only with the aid of two canes.

On psychiatric examination she appeared chronically depressed and cried frequently. There was much psychomotor retardation. She spoke of her feelings of guilt and of her suicidal wishes. The painful complaint was considered a hallucination, since it existed in an area devoid of sensation. A diagnosis of involutional psychosis was made. It was considered that the prognosis for recovery was poor.

At this time, lobotomy was discussed frankly with the patient and her husband, including its possible unfavorable effects on the personality. It may be noted that prior to the onset of this illness the patient had adapted satisfactorily as a housewife and mother of two children and had taken part in community activities. Prefrontal lobotomy was performed on October 1. One year later, her physician reported that she was at home free of the pain complaint. She was performing some of her housework and apparently managing well with limited responsibilities.

The patient whose pain complaint is symptomatic of an emotional disorder often presents a complicated diagnostic problem and commonly a major problem in therapeutic management. Remonstrating with such a patient or denying him the support of medication without providing him the insight and appropriate treatment for his psychiatric disorder usually leads to an accentuation of his symptom. In some instances drug dependency is the only satisfactory solution to the patient's dilemma.

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*Analgesics and Pain Threshold**

Effects of a drug on the human pain threshold are accurately determined by the warm-wire algesimeter of Lee, Williams and Pfeiffer or the tooth algesimeter of Goetzl, Burrill and Ivy. The former is applied to the forehead and the latter to a dental filling.

In trial at the University of Illinois, Chicago, Robert E. Lee and Carl C. Pfeiffer found Dromoran, a morphine-like analgesic, effective for healthy adults in 3 mg. doses. Nisentil, related to Demerol, failed in possibly inadequate portions of 20 to 30 mg.

The small portable warm-wire device consists of a nichrome resistance wire, crimped to form an applicator, in series with a source of electricity, a rheostat to vary the current, and a milliammeter.

The dental apparatus provides an induced intermittent current as a secondary coil is moved toward a rotating primary coil. The range is 0 to 4.2 volts.
ments of 0.2 volt.

To measure forehead pain, five spots are touched with cool wire, then with the warm tip at intervals of five seconds. The current is adjusted until three or more painful stimuli are perceived with five applications, then reduced until two or less of five are observed.

With the tooth algesimeter a painless sensation or true pain may be used as the end point.

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*Robert E. Lee and Carl C. Pfeiffer: Influence of analgesics, Dromoran, Nisentil, and morphine on pain threshold in man. J. Applied Physiol. 4:193-198, 1951.

Analgesic Effect of Roentgen Rays

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THE length of the list of conditions in which roentgen rays may be applied to relieve pain is shrinking steadily. After the observation by some of the pioneers in roentgenology that pain unexpectedly left after roentgenologic examination of a variety of lesions, the list of conditions in which roentgen rays had an analgesic effect grew rapidly. In fact, one might get the opinion from the early literature that roentgen therapy could well be used in the treatment of almost any disease in which pain is a symptom. The following list, which probably is incomplete, is not arranged in either alphabetic or chronologic order, but it does indicate the multiplicity of painful conditions in which treatment with roentgen rays has been reported to have been beneficial: epilepsy; poliomyelitis; pernicious anemia; diabetes; carcinoma of the stomach; trigeminal neuralgia; carcinoma of the breast; sprains; contusions; carbuncles; furuncles; callus; corns; plantar warts; arthritis; gout; otitis; tuberculous arthritis; meningitis; phlegmon; adenitis; erysipelas; backache; intercostal neuralgia; mastoiditis; sciatica; migraine; tendinitis; apical abscess of teeth; mastitis; myositis; brachial neuralgia; arachnoiditis; bursitis; pruritus; herpes simplex; herpes zoster; diabetic neuritis; cyclic headache; osseous metastasis; fibrositis; spondylitis; torticollis; pain due to syphilis, gonorrhea, streptococcic infection and other types of infection; pain due to alcohol, deficiency diseases, metal-poisoning anemia, and, last, idiopathic pain.

One might include pain due to some trouble in the head, neck, arms, thorax, abdomen, spinal column or canal, pelvic girdle, intrapelvic organs, hips, legs, knees, ankles or feet.

Nowadays, the conditions for which roentgen rays have a place in treatment number, perhaps, a half dozen.

One may mention three chief reasons for this trend toward conservatism and minification: (1) Medical progress has tended to assess a more realistic value to roentgen therapy for the treatment of painful conditions, (2) the true nature of many types of pain has become better understood with the passage of time, and (3) many painful diseases have been demonstrated not to be diseases at all but merely symptoms.

Many other kinds of analgesics have been devised. One need only to refer to the salicylates, the bromides, and many other kinds of chemical compounds, all of which have a proved and stable place among the remedies for pain.

For the relief of other painful conditions, specific operations have not only a low risk but are quite certain to have a beneficial effect. In short, neurosurgery and anesthesiology have, in many instances, displaced more or less empiric roentgen therapy as a method of treating conditions that produce pain.

Another very important reason why other methods of relieving pain have taken precedence over roentgen therapy is that they usually involve less risk of permanent or severe injury.

That "the cure should not be worse than the disease" is a trite, banal phrase that one hesitates to write. Yet this axiom must have been unknown or forgotten or ignored by many doctors when the treatment of miscellaneous benign lesions causing pain was contemplated. That hypothesis is tenable, if one may be allowed to express an opinion, for instance, from the all too frequently observed substitution of a cancer for pruritus for which roentgen therapy was used. Of course, in the early days, roentgenologic dosimetry in the modern sense was unknown, and tissue sensitivity and the limits of safety also were only vaguely known and imperfectly understood. Nevertheless, one sees too often the unfortunate sequelae of the indiscriminate, inept roentgen treatment of benign conditions, often without much pain, to lead one to wonder what the doctor who administered the roentgen therapy could have been thinking about, provided one assumes he was thinking at all. The senselessness and the hazards of overtreatment of benign conditions has been emphasized too frequently by radiologic authors to merit any more than allusion here.

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If one admits that there is an analgesic effect of roentgen rays that is not due to the natural course of events and is not a psychic effect, one must look around for an explanation of its mechanism. Obviously, it is not a good subject for animal experimentation. Morphologic change in the nervous system (which is well known to be very resistant to irradiation) can hardly be advanced as a reason for the benefit. Nevertheless, because analgesia has been said to follow the treatment of such a wide variety of lesions as listed previously, the most plausible explanation is that roentgen rays produce their analgesic effect by destruction of cells. Pain is supposed to be caused, generally speaking, by pressure of inflammatory or malignant cells on sensory nerves, and occasionally by their direct infiltration into sensory nerves. The degree of benefit after roentgen therapy depends, therefore, on the radiosensitivity of the cells, benign or malignant, which are concerned with the painful condition in point.

Contraindications to the treatment of painful conditions with roentgen rays depend more or less on the experience or opinion of the individual roentgenologist. Whatever list of them may be given is, naturally, subject to revision. Among the generally accepted reasons for not using roentgen therapy for the relief of pain are the following: Some other method is specific for the relief of the pain in question; some other method entails less expense and inconvenience to the patient and it is easier to use than roentgen therapy; some other method can be used with a more certain or a better result; some other method does not involve in its administration such highly specialized technical skill as "good" roentgen therapy requires; expressed another way, some other method of treatment can be used by physicians who lack the training required by roentgenologists; and, perhaps of greatest importance, treatment by some other method is not followed by an immediate or late injury. There is no excuse for any injury that follows treatment of pain caused by a benign lesion.

Strange as it may seem, injury is not the most frequent sequela of amateur roentgen therapy of annoying rather than severely painful conditions. Topping the list is pruritus, due to whatever cause. Eczema is second. Because relief of itching from eczema and from pruritus (ani, vulvae and scroti) is almost certain to follow mild roentgen therapy. The recurrence or recrudescence of these troubles is in turn alleviated by roentgen therapy, too often alleviated, to the point where some roentgen-ray injury follows as a late result. This result in too many instances is "x-ray cancer."

Repeated "cures" of these two conditions by roentgen therapy are, therefore, not very sensible. If one balances the causes against these effects of analgesic roentgen therapy, one cannot condemn too strongly the indiscriminate use of the medium.

A benign, painful lesion that may be cured in about 80 per cent of cases by a single dose of roentgen rays is the plantar wart. Patients who have this lesion often say it makes them feel as if they were walking on red-hot nails. It is not at all unusual for pain to disappear completely within a week after treatment with roentgen rays. However, there are some warts that are quite refractory to roentgen therapy that is within the limit of safety. For this reason, repetition of roentgen therapy is dangerous, because it may be followed by ulceration of the area treated. The cure of this complication may entail radical excision of the ulcer and subsequent skin grafting. How these injuries can be eliminated, or at least, minimized is self-evident.

Roentgen therapy is one of the components of the multiphase treatment of spondylitis. The doses commonly used are low, and several courses ordinarily are given at appropriate intervals. Most patients with rheumatoid spondylitis experience a pleasing alleviation of stiffness and pain.

However, it is the reported observation of several radiologists and rheumatologists that a "menopause" (temporary in most instances) follows the roentgen therapy of this not very painful disease in women. Sometimes this complication has not been due to doses that were "too high." Sometimes, the fields through which roentgen rays were given were not too low, and therefore should not have caused the ovaries to receive an unintended dose of roentgen rays. Nevertheless, it should be remembered that the position of the ovaries is variable. For that reason, it is our practice at the Mayo Clinic to make the lower limit of the fields to be irradiated at the level of the acetabulum, and to direct the vertical beam obliquely upward with the intention of minimizing the dose at all points in the pelvis. Be that as it may, the occurrence of an unexpected, unintentional, menopause in a woman whom he has treated for spondylitis makes a radiologist think much more seriously about his technic and the results of treatment of spondylitis than does the 80 per cent benefit he is assured by "statistics."

I would like to interject here the remark that I do not believe that roentgen therapy of any benign condition by the rules in any "cook book" on therapy can replace, or even resemble, treatment given by the experienced roentgenologist who follows no rules. Treatment of malignant lesions is an entirely different subject.

Thus far the reader most likely has formed the definite impression that there is not very much to recommend roentgen therapy for the relief of pain, but let me state that I have made the previous remarks with malice aforethought.

In the treatment of the following conditions, roentgen therapy is probably the method of choice. True, other methods are used, but generally not so effectively, and not so efficiently. These conditions are associated with severe pain which usually is intractable.

ACUTE SINUSITIS

Acute sinusitis is a very painful condition which usually follows a cold. The pain may be confined to one sinus, but most of the patients who are referred for roentgen therapy have pansinusitis.

Most radiologists who have written about the treatment of this condition have said that relief of symptoms follows two to four treatments. The more acute and painful is the sinusitis, the lower are the doses of roentgen rays that are used. It is generally said that roentgen therapy produces results that are better than those produced by any other method, but authors admit that the lesions suitable for this type of treatment should be selected by the appropriate specialist.

The relief of symptoms after roentgen therapy is due to re-establishment of drainage by relief of the inflammation that blocked the ostia.

ACUTE BURSITIS OF THE SHOULDER

Acute "painful shoulder" (bursitis) is another condition that responds rapidly and satisfactorily to roentgen therapy. In my experience, the presence or absence of lime around the shoulder makes no difference in the result. Although the duration of an acute "bursitis" of the shoulder is variable and indefinite, it is commonly admitted that, even though the roentgen therapy does not shorten the course of the disease, it does make the patient more comfortable. In fact, it is not at all surprising for a patient who has had a "frozen" shoulder, one which hurt if looked at before treatment, to have a normal shoulder the day after a single dose of roentgen rays. Chronic bursitis of the shoulder and other joints is perhaps better treated by some other method.

PAIN DUE TO HERPES OTHER THAN HERPES SIMPLEX

It is well know that pain may precede, accompany, or follow the appearance of lesions in the skin. Herpes zoster is common in cases of tumors of the lymphoblastoma group, and it also is common in patients who, except for the presence of herpes, are perfectly healthy. As a rule, the patients who are referred for roentgen therapy do not have mild pain, but their pain is severe and almost intolerable. Many patients say that it feels like a flame.

Roentgen therapy is best given to the spinal roots of the nerves distributed through the zone of the pain, and if an eruption is present, the roentgen rays also should be applied to the involved area of skin. The technic of roentgen therapy, its frequency of repetition, and the total doses conform with the usual treatment of inflammation. The more chronic is the duration of the pain, the less certain is relief to follow roentgen therapy, but at any rate, with the possible exception of injecting or cutting the nerves, no other method produces comparable benefit.

PAIN DUE TO PSORIATIC ARTHRITIS

One must admit that the discomfort this lesion produces is a chronic, steady aching rather than true pain. It also is true that not all psoriatic patients have this complication of the disease. Psoriatic nails are not present in all cases.

My experience has shown that roentgen rays given by cross-firing fields that extend well above the wrist or the ankles, as the case may be, and administered in mild doses and in two, three or four courses, produce definite and long-lasting palliation.

PAIN DUE TO SECONDARY CARCINOMA OF BONE

One should never forget that carcinoma may spread to bone at any time, and that metastatic involvement of bone is not always a late process. At first, the pain may be mild, and one that can be mistaken for something else, especially if the results of roentgenographic examination are indefinite or inconclusive. As time passes, the pain becomes more severe and more steady. It may become so severe that increasing doses of narcotics may be necessary for its control. In rare cases in which carcinoma has invaded bone, the severe pain may cease entirely and spontaneously. This is because the growing carcinoma cells which have been stretching the periosteum and causing pain thereby have ruptured through it and are now growing extraperiosteally.

(Continued on page 124)

Thoracic Pain in Cardiovascular Disease

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PAIN is often a prominent symptom, and sometimes it is the only manifestation, of cardiac disease. Pain in the presence of heart disease may be owing to myocardial ischemia or to pericardial irritation and it may occur in association with certain diseases of the aortic arch.

Besides these various types of pain related to cardiovascular disease, many other types of pain occur in, or are referred to, the thoracic region. The exact diagnosis in each case depends on the careful taking of a history and on the demonstration of objective evidence of organic disease either in the heart or in adjacent visceral or other structures. The same patient may have several types of pain. For example, he may experience pain because of coronary insufficiency, gallstones or an esophageal hiatal hernia; he may have musculoskeletal pains in various parts of the thoracic cage. A key question which frequently clarifies the situation in the patient's mind is, "Does your pain always behave in exactly the same manner?" If it does not, then detailed questioning is required to determine just how many different pain patterns are involved. A story that is confusing to begin with soon unfolds as the patient supplies the data that are suggestive of the specific entities involved. At times these data are diagnostic in themselves and, at other times, further proof is furnished by appropriate roentgenographic, electrocardiographic, or other laboratory procedures.

In the final analysis, the symptoms must be completely compatible with the objective findings; otherwise, errors will result not only in diagnosis but also in the treatment to be instituted, as well as in the prognosis that has been established in a given case. Demonstration of an esophageal hiatal hernia does not necessarily mean that the patient's symptoms are attributable to that abnormality; abnormal findings in the electrocardiogram do not necessarily mean that the thoracic pain which brings the patient to the physician is owing to coronary disease. Laboratory evidence, moreover, can be misleading at times; so, when symptoms and findings are incompatible, then the emphasis had better be placed on the former rather than on the latter. Finally, as stated before, pain may be the only manifestation of disease and the only key to its diagnosis.

THE PAIN OF MYOCARDIAL ISCHEMIA

Pain of myocardial ischemia; namely, angina pectoris, is most frequently caused by disease of coronary arteries. When a coronary artery is narrowed, angina pectoris occurs with increased readiness if the narrowing is associated with hypoxia, such as occurs in severe anemia, in emphysema, or when coronary blood flow drops as the result of rapid tachycardia. The same is true in the presence of aortic valvular heart disease, when the cardiac output, and hence the coronary blood flow, is diminished. In the last-named circumstance, angina may occur even though the coronary circulation is intact. In association with syphilitic aortitis, the ostia of the coronary arteries may be narrowed, which explains the frequency of angina pectoris in the presence of this disease.

The character of the pain of myocardial ischemia is essentially the same regardless of the cause of the ischemia. The duration and intensity of the pain, however, vary under the different circumstances in which angina pectoris occurs. In general, it may be said that the duration of the pain depends on the duration of the ischemia. Intensity of the pain, however, is extremely variable under the same circumstances among different individuals because some individuals can tolerate more pain without complaint than can others.

Angina of Effort. The chief characteristics of angina of effort are as follows: (1) Its onset and cessation are related respectively to increased and decreased cardiac work. Increase in cardiac work occurs during exertion, as a result of excitement and, with even less exertion, after meals and in cold weather. (2) The typical distribution of the pain is retrosternal, not precordial. In most cases it tends to appear in the midline, behind the sternum, in the epigastrium, or in the throat, and to spread centrifugally. It may extend into the ulnar side of the left arm, less often to both arms, to the right arm alone, or into the lower jaw. Occasionally it starts in the arm or arms and spreads centripetally to the regions just mentioned. The pain may be felt only in the wrists or only in the upper part of the abdomen. (3) The onset of the attack is abrupt and its duration is short, for reasons which have been given. It usually lasts less than five minutes. (4) A small percentage of patients do describe their pain as precordial, that is, in the left anterior portion of the thorax, but in these cases all the other criteria mentioned, especially the relation of pain to effort, hold true.

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Vasodilating drugs such as glyceryl trinitrate and amyl nitrite terminate the pain more quickly than will rest alone, and at times the response of thoracic pain to these drugs is helpful in differential diagnosis.

Angina Associated with Myocardial Infarction. The pain resulting from acute coronary occlusion with myocardial infarction has all the characteristics of angina of effort. It is, however, more severe and more prolonged in most instances; it is not relieved by vasodilating drugs; it may occur while the patient is at rest or even in the course of sleep. A patient with a history of angina of effort may experience a number of attacks of more prolonged angina (15 to 30 minutes) unrelated to effort, representing prodromes of acute coronary occlusion or its actual onset.

Acute myocardial infarction may be the first symptom of coronary disease and, in a number of cases, the attack of pain is initiated by some unusual activity such as shoveling snow or a brisk walk after a heavy meal. The probable explanation of such an event is hemorrhage into the wall of the artery at the site of an arteriosclerotic plaque. This hemorrhage constricts the lumen of the artery in that region and facilitates later complete thrombotic closure.

The symptoms of myocardial infarction vary from mild attacks of acute indigestion to severe seizures. The mild attacks, called "acute indigestion," are really episodes of anginal pain which is referred to the epigastrium or lower part of the sternum; they last 15 to 30 minutes and gradually disappear. The severe seizures may last many hours and may be associated with all the signs of severe shock. In other cases the attack is represented by an episode of severe dyspnea, with or without evidence of acute left ventricular failure, and with complete absence of pain, or at the most a mild sense of burning. Except in the milder attacks, the patient usually looks anxious, as in all vascular occlusions, perspires freely, has an ashen color and the blood pressure decreases. Occasionally it is elevated at first and later drops. The last is a peripheral vascular phenomenon associated with shock. The heart sounds often reveal nothing significant although at times they may be fainter than they were before; gallop rhythm may be present and, in a few cases, ectopic rhythm develops. Frequent extrasystoles may precede such an episode of ectopic rhythm.

In the succeeding hours, moderate temperature and leukocytosis develop; the sedimentation rate begins to be accelerated after twenty-four hours, although this may be delayed for days. If the anterior surface of the left ventricle is involved, a pericardial friction rub may appear. This finding indicates localized pericarditis over the site of the infarct. The duration of the symptoms of shock varies with the severity of the attack and with the response to treatment. The temperature tends to become normal after a few days.

Electrocardiographic manifestations indicative of acute myocardial infarction may be present shortly after the onset of the attack, or they may be delayed for many days.

In general, it can be stated that any changing pattern in serial electrocardiograms after an episode of thoracic distress or of acute dyspnea must be considered to be the result of acute myocardial infarction until proved otherwise. One or more of the following changes should be searched for especially: the appearance of Q waves, the diminution of R waves, displacements of the RS-T segments, inversions of T waves and conduction disturbances. When T_1 becomes the mirror image of T_3 under these conditions the change almost certainly is indicative of infarction.

THE PAIN OF PERICARDIAL IRRITATION

The pain of pericardial irritation is one of the classical manifestations of acute pericarditis. It is to be noted, however, that pericarditis may occur without pain. Pericarditis may occur as a complication of pneumonia and septicemia or as part of the clinical picture of rheumatic fever, tuberculosis, disseminated lupus erythematosus, myocardial infarction or uremia. Another type of pericarditis, spoken of as "nonspecific pericarditis," may occur without any specific demonstrable etiologic factor. This type of pericarditis frequently occurs shortly after an infection of the upper part of the respiratory tract and eventually ends in complete recovery.

The pain of pericarditis may be widespread over the whole thorax or it may be localized in the substernal, pericardial, epigastric or intrascapular regions. It may extend into the neck and occasionally into the arms. It has been described as "aching" or "squeezing" and is characteristically aggravated by breathing, coughing, twisting of the torso and swallowing. There is some reason to believe that the pain of pericarditis depends on involvement of the parietal pericardium and the adjacent part of the pleura. This may explain why pericarditis at times is entirely painless; that is, these sensitive tissues are then not involved. The presence of pericarditis is further corroborated by the presence of a pericardial friction rub, by certain roentgenologic and electrocardiographic findings or by recognition of the primary disease responsible for it; it is to be recalled, however, that in so-called acute nonspecific pericarditis, no evidence of a primary disease can be demonstrated.

The roentgenologic finding most suggestive of pericarditis is increase in the size of the cardiac silhouette. This may be attributable to increase in the quantity of pericardial fluid, or to cardiac dilatation, or to both factors.

The electrocardiographic features diagnostic of pericarditis are as follows: elevation of the RS-T segment, with a dome-shaped or peaked T wave in the early stage, and negativity of the T waves in the late phase. In contrast with the electrocardiographic signs of myocardial infarction, there is no depression of the RS-T segment at any time; the T waves never are in the classic reciprocal relationship in leads I and III, and no Q pattern ever develops in the standard or chest leads.

PAIN ASSOCIATED WITH DISEASES OF THE AORTIC ARCH

Reference has already been made to pain resulting from valvular aortic disease, including syphilitic aortitis. Two other types of pain arising from aortic disease require special mention.

Pain from a Dissecting Aneurysm of the Aorta. Pain resulting from a dissecting aneurysm of the aorta may be indistinguishable from that owing to coronary occlusion. Aneurysm, therefore, can be suspected if repeated electrocardiograms remain unchanged after attacks which clinically have the hallmarks of myocardial infarction, especially if the pain is referred to the upper thoracic vertebrae, and if there is roentgenoscopic evidence of progressive changes in the configuration of the aortic arch. The occurrence of transient neurologic signs and symptoms among patients who have prolonged attacks of anginal pain is further strongly suggestive evidence of dissecting aneurysm of the aorta. These neurologic manifestations are dependent on the fact that the segmental branches of the aorta which are part of the vascular supply to the spinal cord are interrupted as dissection of the aorta proceeds. If the dissection reaches the level of the renal arteries there is usually hematuria.

Pain Associated with Large Aneurysms of the Aorta. Reference here is made to pain produced by the mechanical effects of large aneurysms of the aorta, in contrast to the anginal type of pain already described in association with syphilitic aortic insufficiency and coronary osteal narrowing. Large aneurysms may cause pain by eroding adjacent bony structures such as the sternum, ribs or thoracic vertebral bodies, by pressure on nerve roots and by displacement of intrathoracic viscera. Fortunately, aneurysms of the aorta rarely are seen nowadays because syphilis, one of its frequent causes, is now effectively treated in its early stages.

The pain resulting from erosion of bone is persistent and may be distressingly severe. In the process of erosion, nerve roots are exposed and pain results in the distribution of the involved nerve root; characteristically, the pain is worse at night. Dysphagia represents the type of pain resulting from displacement of, and obstructing effects on, the esophagus. The diagnosis of large aneurysm usually is obvious from roentgenograms of the thorax and from the mechanical effects of the aneurysm itself. Besides the various types of pain resulting from the mechanical effects of an aneurysm there may be many other signs and symptoms of pressure and displacement. To mention only a few, there are hoarseness attributable to paralysis in the region of distribution of the left recurrent laryngeal nerve, hemoptysis from erosion of a bronchus or the trachea, hematemesis from seepage from, or rupture of, the aneurysm into the esophagus. Cardiac enlargement can be extreme when associated aortic insufficiency is part of the syphilitic process.

DIFFERENTIAL DIAGNOSIS OF THORACIC PAIN

Angina pectoris, the commonest and certainly the most important type of thoracic pain associated with cardiovascular disease, is usually readily identified and distinguished from other types of pain by its characteristic distribution and its strict relation to increased cardiac work.

Esophageal pain, and pain associated with diaphragmatic hernia, may closely simulate angina pectoris; root pain of cervical and upper thoracic origin are mistaken for anginal pain; biliary colic, acute pancreatitis and perforation of abdominal viscera have been mistaken for acute myocardial infarction. Spontaneous mediastinal emphysema can simulate acute myocardial infarction very closely. An emphysematous bleb ruptures, the air which escapes dissects its way into the perivascular connective tissue of the pulmonary blood vessels and reaches the mediastinum. Clinically, the syndrome is characterized by substernal or precordial pain of sudden onset which can extend to the left shoulder, into the neck, or down the left arm. A peculiar crunching sound is heard over the precordium during both phases of the cardiac cycle. A positive roentgenographic diagnosis can be made by demonstration of the presence of air in the mediastinum and by the absence of other evidence of myocardial infarction. Various local conditions of the thoracic wall, such as myositis and arthritis of the spinal column, are only too frequently labeled coronary disease.

Skeletal and muscular pain may be brought on or aggravated by effort, but they are not so closely related to exertion as is anginal pain. Skeletal and muscular pain caused by effort tend to last much longer than angina from effort ordinarily lasts. Use of the upper extremities, furthermore, is more likely to cause skeletal and muscular pain than is walking. Finally, when a patient complains of rheumatic types of pain, there is frequently evidence of a similar disturbance elsewhere. The muscles about the shoulder girdle and the tissues overlying the sacroiliac joints should be palpated carefully to detect the presence of tender fibrositic nodules. Musculoskeletal pains about the thorax frequently extend into either or both arms, a fact that is frightening because most laymen seem to believe that pain which extends in this fashion is always owing to cardiac disease.

A knowledge of pain patterns as manifested by individual diseases is the key to the differential diagnosis of pain occurring in, or referred to, the thoracic region. Despite all the helpful data which can be derived from the various diagnostic procedures, there is no alternative to skillful interrogation of the patient.

Anesthesia for Labor

In competent hands, low spinal anesthesia in the terminal stage of labor provides safe and adequate relief of pain. If time permits, Robert E. McDonald, M.D., and William K. Hoffman, M.D., of Milwaukee, Wisconsin, employ analgesic drugs in the first stage.

Seconal is the best of the barbituric acid group. When labor is well established and the cervix dilated about 2 cm., 3 gr. is given, and an hour later 1½ gr., if contractions are not too rapid and strong. When pain is not controlled, 100 mg. of Demerol and 1/150 gr. of scopolamine may be administered.

Morphine ensures rest in prolonged labor but should not be given within two hours of delivery. Effects are enhanced by 2 cc. of 50 per cent magnesium sulfate injected intramuscularly.

Low spinal block may be done with 1.5 per cent Metycaine in 5 per cent dextrose solution and a 22 gauge short bevel needle. The patient is placed in left lateral recumbent position, with spinal flexion maintained by an assistant, and 2 cc. of solution is injected quickly between contractions, through the fourth interspace if possible, or the third when necessary.

The woman is immediately raised to sitting position, and after 30 seconds laid on her back with head well elevated on a pillow. Anesthesia should extend approximately to the tenth thoracic segment.

Complete freedom from pain is attained in an average of four and one-half minutes or less. Blood pressure is read before, just after, and every five minutes after injection and is usually unchanged. If the level drops below 90 mm., 10 mg. of Methedrine is administered. Anesthesia generally lasts 50 to 65 minutes and if started too soon may be repeated.

Relaxation is excellent, facilitating forceps delivery, rotation, or other maneuvers. Babies escape general anesthetic effects and often cry before fully born. The only immediate care needed is aspiration of mucus.

Minimal spinal anesthesia is excellent in cases of chronic lung or heart disease, acute upper respiratory infection, on premature birth and if no anesthetist is available can be given by the obstetrician.

Robert E. McDonald, M.D. and William K. Hoffman, M.D.: Pain relief in labor and choice of anesthesia. Wisconsin M. J. 50:655-658, 1951.

Pelvic Pain from the Point of View of a Gynecologist*

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When analyzing pain from the gynecologist's point of view it is propitious to limit one's viewpoint, first of all, to those conditions which exist solely within the field of gynecology, and secondly, to assume that the symptom is organic in nature. It is a well-known fact that emotional reactions and mental turmoil have a great deal to do with the symptoms presented by many patients, and many times these symptoms simulate disease on an organic basis. Although a very important portion of gynecologic diagnosis and treatment, the psychosomatic aspects of gynecology will be omitted from this discussion.

To assist toward a better understanding of the various organic entities which may give rise to pain, a brief review of the neuro-anatomy of the female pelvis will first be presented. It will then be possible to understand more clearly the pathways by which pain from organic lesions of the ovaries, uterus, oviducts and miscellaneous structures reach the sensorium.

NEURO-ANATOMY RELATED TO PELVIC PAIN

All sensations of pain which arise in the pelvic viscera are transmitted by the autonomic nervous system below the level of the bifurcation of the aorta where the intramesenteric nerves join to form the presacral nerves. The presacral nerves constitute the chief nerve supply of the bladder, the rectum and the internal genitalia except the ovary and part of the fallopian tube. Passing distally, the nerve fibers diverge to produce the bilateral inferior hypogastric plexus between the superior and inferior plexuses. The fibers of the inferior hypogastric plexus pass downward and lateralward near the sacral end of the uterosacral ligament, then forward over the lateral surface of the rectal ampulla to join the pelvic plexus or the ganglion of Frankenhäuser. The additional nerve supply to the pelvic plexus consists of some fibers from the sacral sympathetic chain arising from the anterior roots of the second, third and fourth sacral nerves. These fibers, through the pelvic plexus, supply the rectum, anal canal, uterus, vagina and the urethra and urinary bladder.

The nerves which supply the ovary are derived from the renal and aortic plexuses; they accompany the ovarian vessels in the tissue of the suspensory ligament of the ovary. The ovaries embryologically arise high in the abdomen and thus receive their nerve supply from a source other than that of the other pelvic viscera. The neurocomponents which supply the ovary originate mainly from the tenth thoracic nerve, while those which supply the oviducts are from the eleventh and twelfth thoracic nerves. Because of the differing anatomic roots it is obvious that presacral neurectomy, although as a rule relieving pain which originates only in the uterus, will have little or no effect on pain which originates in the oviducts or ovaries.

Although neurologists differ relative to the duration of pain from a viscus, they generally agree that visceral pain may be of two types: direct and referred. Both types probably originate from stimulation of free nerve terminations within the specific organ involved. Because the viscera probably have not a developed sense of localization such as that of the skin, various ghostlike disturbances may be set up from an affected organ. The degree of stimulus set up by an organ may also vary in intensity and be influenced by certain tangible factors such as exhaustion, anemia and various mental states. It is, therefore, important that in the proper interpretation of such a stimulus, consideration must be given to its severity, duration, location and quality, and the final interpretation must be based on the general physical state of the patient during the final evaluation.

PAIN OF OVARIAN ORIGIN

Pain of ovarian origin is caused chiefly by stretching of the capsule or a disturbance of the circulation or both. Mention has been made that the sympathetic nerve supply of the ovaries is separate from that of the uterus and that the ovaries have no somatic sensory nerve supply in themselves. Many patients complaining of pain in the region of the ovary are found to have no organic basis for such complaints. Benign or malignant tumors of the ovary do not ordinarily cause pain until they produce peritoneal irritation or stretching. Symptoms produced by torsion of the pedicle of an ovarian tumor are generally due to a combination of effects: (1) the localizing pain due to peritoneal irritation or injury and (2) a diffuse type of discomfort accompanied by reflex gastrointestinal symptoms, such as vomiting, caused by vascular disturbances within the tumor. Such sensations reach the consciousness of the individual through the direct pathways of the sympathetic nervous system.

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A more frequent cause of pain originating in the ovary is ovulation; such pain is commonly termed "mittelschmerz." This discomfort is apparently due to rupture of a graafian follicle, and occurs approximately in midcycle. The fact that this discomfort recurs regularly is probably one of the most important single diagnostic aids. This pain is generally unilateral in type, and one may elicit a history of a previous similar pain on the opposite side. It is not unusual to hear this complaint presented by young women (less than 25 years of age). Occasionally, because of the rapidity of onset and severity of symptoms and possibly because of continued bleeding from a small arteriole, the patient will be found to have a diffuse rigidity of the right lower quadrant simulating ectopic pregnancy, appendicitis or small twisted ovarian cyst. It is necessary in such cases to explore the abdomen in order to determine the exact source of the hemorrhage. The rupture of a small endometrioma might also mimic such a picture. In the usual case the treatment is watchful expectancy. When the nature of the lesion is doubtful, culdoscopy may aid in the diagnosis.

When laparotomy is found expedient, a thorough knowledge of ovarian pathology and physiology is necessary before definitive treatment may be offered. Except for ovarian involvement in chronic tubo-ovarian disease, extensive endometriosis or malignancy, conservation of as much ovarian tissue as possible is necessary during the reproductive years. Since the gynecologic surgeon must be a skilled diagnostician, his most important aid to diagnosis is a carefully performed pelvic examination. If at all possible, this examination should be conducted without anesthesia. In this manner the surgeon elicits the help of the patient and more adequately localizes her presenting complaint. Additional aids in the diagnosis of ovarian pathology are pneumoroentgenograms, roentgenograms of the pelvis, culdoscopy and occasionally peritoneoscopy.

PAIN OF UTERINE ORIGIN

Most uterine tumors per se are asymptomatic. When signs and symptoms are present, they result from the physical presence of the tumor, from pressure on and adherence to surrounding structures, or from secondary changes in the tumor itself.

Leiomyoma of the uterus, designated correctly "fibromyoma" and colloquially "fibroid," is the commonest tumor in human beings. It originates in the wall of the uterus and grows either into the uterine cavity or the abdomen. As the tumor enlarges, the uterus is distorted and elevated into the pelvis, displacing the bladder upward. With such enlargement the surface is brought into contact with other structures and, not infrequently, adhesions form between the myoma and the intestine or abdominal wall. If the myoma is pedunculated, the pedicle may disappear and the tumor then becomes attached to another organ—a so-called parasitic myoma.

Subserous myomas may twist on the pedicle and cause sharp pain. Pain may be elicited also by deformities of the uterine cavity and accumulation of blood and secretion behind the point of stenosis. In approximately 1 per cent of fibromyomas a sarcomatous change may occur. Under such conditions a rapid change in the size of the tumor may be noted. Secondary changes are commonly seen in tumors undergoing rapid development. During pregnancy, such secondary changes are conspicuous, partly because of pressure symptoms and partly because of hormonal stimulation of the muscle cells.

A very common condition seen by the gynecologist and localized within the uterus is chronic cervicitis. Pain is often the presenting complaint. Many a woman who has borne children will complain of a painful condition within the lower part of the uterus and will limit the site of pain to the vicinity of the uterosacral ligaments. This discomfort is probably due to retrograde spread of chronic cervicitis, the infection traveling along the lymphatics in the uterosacral ligaments to the presacral plexus and causing a so-called presacral neuritis. Particles of India ink injected into the substance of the cervix may be removed from the vicinity of the presacral nerves. It is therefore quite possible that infection within the cervix may cause this pelvic discomfort. Treatment of the cervicitis and endocervicitis by cauterization cures a great number of these patients in whom there is no other cause for pelvic pain and discomfort. Large cystoceles, descensus uteri and prolapse may also cause deep abdominal discomfort and, occasionally, actual pain due to pull upon the supporting structures. These conditions require either the use of a pessary for support or surgical correction of the abnormality.

While retrodisplacement of the uterus has been blamed for many of the pains that occur within the lower part of the pelvis, rarely is it the etiologic factor. Such a displaced uterus may, by its position, cause vascular congestion and stasis which secondarily involve the nervous structures within the pelvis; rarely, however, does this actually occur, and more rarely still is surgical exploration necessary. If the uterus is not fixed within the pelvis because of endometriosis or other adhesions, replacement of it into normal position and the insertion of a pessary may bring relief. It is only after relief has been demonstrated repeatedly by use of a pessary that surgical measures should be offered as the treatment of choice.

Carcinoma of the uterus, whether it be in the body or in the cervix, is notoriously asymptomatic until its processes involve contiguous structures or nerves. Excruciating pain may be associated with carcinoma of the genitalia when nerves or even bones in the pelvis are involved. The diagnosis of carcinoma of the corpus uteri is made on the basis of a history of bleeding or metrorrhagia occurring during the menopause or some years after the cessation of the menses, plus acquired leukorrhea, a foul, odorous discharge and the microscopic appearance of such discharge, and the histologic study of curettings. Pain is usually indicative of a far-advanced lesion.

A frequent cause of lower abdominal pain is a postabortive process which involves the uterus primarily. In such a condition one finds a large, boggy, tender uterus and it is possible to elicit marked pain on cervical manipulation. One may find, in addition, nodular thickening of the adnexa and ovarian abscesses. Occasionally, the patient sees the gynecologist because of deep thrombophlebitis or phlebothrombosis. If the patient is seen some weeks after the initial acute process, brawny induration involving the entire pelvis is noted. The diagnosis is made on the basis of the palpable findings plus a history of instrumentation followed by chills, fever and lower abdominal pain. Not infrequently, there is a purulent foul-smelling discharge.

Inflammatory cervical strictures may cause severe colicky lower abdominal pain. Such lesions dam back the normal uterine secretion and produce stagnation and subsequently pyometria. Sometimes such conditions follow extensive cautery of the endocervix. A similar process may accompany cervical malignancy.

Extreme degrees of procidentia may produce discomfort and pain in the lower part of the pelvis. Often, the severity of such symptoms is not at all in proportion to the degree of the uterine descent. The pain is caused chiefly by the enteroptosis which follows descent of the pelvic viscera and the resulting changes in the intra-abdominal contents. Difficulties with the bladder and rectum, especially the former, are also common under such conditions because of the distorted position of these organs. Voiding and defecation may become extremely difficult without manual reduction of the prolapsed masses. The degree of pain is determined somewhat by the amount of vascular engorgement and hyperemia coincident with endometrial hypertrophy as well as by cervical disease.

Dysmenorrhea or painful menstruation is usually spoken of as a disease though actually it is a symptom or manifestation of some underlying organic or functional abnormality. The secondary or acquired type is due to pelvic lesions and may not be entirely dependent on uterine disease. Since the condition is frequently incapacitating and occasionally a forewarning of serious pelvic disease, the solution of the problem is a vital and pressing matter. All efforts should be made to investigate the genital system from the hymenal ring to the tubes and ovaries to detect abnormalities. Since various theories have been offered to explain the development of secondary dysmenorrhea, one cannot take for granted that any one in itself is correct. Essentially, any condition which results in chronic pelvic congestion may cause dysmenorrhea, and in many instances it is not necessary to look further for the causes than chronic fatigue, constipation or lack of exercise. Presacral sympathectomy with complete excision of the superior hypogastric plexus as proposed by Cotte is an especially effective form of therapy but it should be offered only in those cases in which no pathologic changes can be found outside the uterus and in which all usual medical treatments have proved of no avail.

Membranous dysmenorrhea is usually characterized by very severe pain and the passage of shreds in the menstrual blood which at times amount to a complete cast of the uterine body and cervical canal. Such a cast represents the submucous surface of the uterus and microscopically it may show no variation from normal endometrium or it may exhibit changes suggestive of decidual formation. Various theories have been offered for such a phenomenon, and the etiologic basis is not clear. Whatever the origin, the process represents an extreme degree of physiologic shedding of the endometrium which normally occurs with each menstrual cycle.

Endometriosis, either of the internal or external variety, has pain as its most common single symptom; only approximately 25 per cent of patients with the disease are free from that symptom. Since the lesions found are so varied in their location and nature, the location of the pain is extremely variable. In the most common type of endometriosis the presenting symptom is lower abdominal pain that occurs either unilaterally or bilaterally. Such discomfort is characteristically aggravated premenstrually and leaves a residual pelvic soreness. This condition should always be considered as a possibility when a history is obtained that progressively severe dysmenorrhea has come on after the age of 20. Depending upon the location of the endometriosis, the following symptoms may also appear: menorrhagia or metrorrhagia, sterility, and in certain late cases varying degrees of intestinal obstruction, painful defecation or hematuria. The presence of shotty induration in the region of the uterosacral ligaments or nodular beady thickenings that are palpable along the posterior surface of the uterus and are associated with an adherent retroplaced uterus constitute probably the most suggestive single palpable finding of endometriosis. When such a finding is associated with the symptoms previously described, the diagnosis is unquestionable.

Following the failure of palliative measures the patient many times must be offered surgical treatment in an attempt to alleviate the painful symptoms of endometriosis. Since the disease is notoriously diffuse in location, the final decision regarding the extent of the operation must not infrequently be made at the time of operation. Each case must be judged individually, taking into consideration the extent of the lesions, the patient's age, and her feelings concerning childbearing. Conservative treatment is the one of choice in the younger individual.

PAIN ORIGINATING IN THE OVIDUCTS

Ectopic pregnancy most commonly occurs in the fallopian tube and is one of the causes of severe pelvic pain seen by the gynecologist. The etiologic basis awaits further explanation, but in the majority of instances the direct cause is some mechanical interference with the passage of the fertilized ovum down the oviduct. The symptom of pain may be elicited in the patient who has an unruptured ectopic pregnancy as well as in the one in whom rupture has occurred. A consequence of tubal pregnancy that occurs more frequently than tubal rupture is tubal abortion. This seldom occurs later than the third month of gestation and is brought about by hemorrhage which loosens and separates the ovum from its bed and allows the fertilized egg to be extruded into the abdominal cavity. Under such conditions the discomfort may be only temporary and may pass unnoticed.

Although tubal rupture occurs less frequently than does tubal abortion, it is usually sudden in onset and is accompanied by alarming hemorrhage into the peritoneal cavity. Cramplike pains of moderate severity may direct attention to the pelvic organ. Before actual tubal rupture, the symptoms are atypical of early pregnancy. Usually, a menstrual period has been missed or the flow has lasted not more than one day. Tenderness of the breasts, nausea and a feeling of general fatigue or malaise may occur. The uterus is usually moderately enlarged, and in all respects it presents changes suggestive of an early intra-uterine pregnancy. Although the involved tube may be palpably enlarged, the diagnosis is invariably difficult.

After tubal rupture, the clinical picture is rather characteristic. The pain produced is acute and associated with fainting and the passage of blood through the vagina. Referred pain to either shoulder is not uncommon. The subjective symptoms may be all out of proportion to the amount of free blood found within the peritoneal cavity. The frequency with which tubal pregnancy escapes diagnosis is outstanding evidence of the unsatisfactory manner in which some histories are taken or in which some patients record their menstrual dates. Perhaps no major organic condition is more often mistaken or incorrectly diagnosed than is tubal pregnancy. Pregnancy tests give positive results in this condition, but many times the consulting gynecologist cannot await the report on such a test. When the diagnosis is confirmed, the removal of the affected tube together with the products of gestation is indicated. The ovary on the affected side usually may be spared. Frequently it is necessary to support the patient, both during and after the operation, with transfusions of whole blood.

Salpingitis, a bacterial inflammation of the fallopian tubes, originates usually by extension upward from the lower part of the genital tract but may also occur by extension through the lymphatics or blood stream or by continuity. Regardless of the etiologic factors, the tube responds by hyperemia, distortion and congestion. In certain types of infection, particularly those of the gonococcal variety, the mucosal surfaces are agglutinated and the cilia are destroyed. Frequently, pain is initiated at the time of a normal menstrual period. The pain is often bilateral and progressive in type. There is marked general lower abdominal tenderness when the peritoneum is involved, and the initial symptoms become exaggerated when purulent discharge escapes from the fimbriated ends of the tube. If the disease remains untreated, the symptoms may exist for a period of weeks and then become quiescent, reappearing with remissions and exacerbations. Not infrequently, new attacks follow coitus or a vigorous bimanual examination. If such a disease process is allowed to continue, adhesions often form and the process extends to and involves the ovary and adjacent structures. Under the latter circumstance, the patient may complain of bilateral pelvic pain of a dull dragging type.

Conservative management under ideal surroundings will undoubtedly result in many symptomatic cures, but complications generally require surgical intervention. Under proper antibiotic management, acute salpingitis will, in the majority of cases, remain localized and symptoms will slowly disappear, no further treatment being necessary. If the patient is seen in the later stages of the disease and the pelvic discomfort is debilitating, surgical measures should be recommended. Since the majority of tubal infections occur in younger persons, conservative treatment should be given whenever possible.

Although now rarely seen, genital tuberculosis originates in the tubes in approximately 90 per cent of cases. The condition is practically always the local manifestation of a general disease, although the primary focus may no longer be active. It may occur at any age but is commonest in women in the childbearing period and is a frequent cause of tubal infection in virgins and in younger persons. Although tubal tuberculosis may exist in an inactive and quiescent form, the first sign of involvement may be localized pain referred to the pelvis. Sterility is inevitable, and sometimes an endometrial biopsy performed during an investigation of infertility reveals the tuberculous focus. The prognosis is dependent upon the degree of generalized involvement and the stage of the local lesion. Medical management should perhaps be given priority in the treatment of such patients, but occasionally surgical treatment must be offered for complete eradication.

Severe pain is occasionally encountered in patients having periovarian cysts. The outer end of the wolffian ducts may be dilated into cysts of Morgagni which lie near the fimbriated end of the tube. Although the cysts seldom give rise to clinical symptoms, on rare occasions they twist on their pedicle and cause severe acute pain that necessitates laparotomy. Since such cysts are usually of small caliber, the preoperative diagnosis is rarely made.

Since the specific character of a primary tumor of the oviduct is usually not demonstrable before operation and since such a tumor is symptomatically indistinguishable from solid growths of the ovary or metastatic growths associated with carcinoma of the body of the uterus, the diagnosis of such a tumor is not often made although the patient may present pain as a symptom of the growth. Even with the abdomen open, the site of origin of such a growth may be difficult to ascertain.

PAIN OF OTHER ORIGIN

Thrombophlebitis of the deep pelvic veins is not uncommon. Such a condition is of special importance because of the potential danger to the patient from sepsis and embolism. The chief precipitating causes of pelvic thrombophlebitis are trauma and pelvic infection, often coincident with obstetric delivery or difficult pelvic operations. The presenting symptom may be pain, which may be located deep within the pelvis.

Heparin or dicumarol is now widely used in the treatment of such conditions. Since the individual response to treatment with dicumarol varies greatly, the clinician must be aware of the prothrombin activity. Excessive prolongation of the prothrombin time resulting from such therapy may be combated by the intravenous administration of vitamin K. Transfusions of whole blood may also be necessary. Since thrombophlebitic phenomena accompany pelvic operations more often than they accompany any other type of operation, it is important for the gynecologist to have a thorough understanding of the pathology involved. Correct surgical technic and treatment with antibiotics and dicumarol act as safeguards against a serious and sometimes fatal outcome.

SUMMARY

Since pelvic pain is frequently the principal complaint of the patient consulting the gyne-

(Continued on page 120)

Pain Relieving Drugs

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THE MAJORITY of medical literature deals with various phases of diagnosis and treatment aimed at correcting or removing pathologic changes producing disease. This is of course desirable and a measure of the progress of medical science. If, however, the physician's ability to aid the welfare of his ill patients was confined solely to these aspects of his profession, the practice of medicine would stand in disrepute; patients who felt they had received adequate benefit would be grateful but extremely few in number. The complaints which lead a patient to consult his physician are many, but by all odds the commonest is a demand for the relief of pain or discomfort. If one could imagine the human race subject to all the same diseases and injuries which now plague it, but deprived of the appreciation of the pain which is caused by these processes, the demands on the medical profession would be reduced overnight to a small fraction. The average patient is sublimely uninterested in the underlying disease from which he suffers. The pathology and disturbed physiology of the illness attacking his body are a matter of indifference to him. He doesn't know whether his stomachache is due to a peptic ulcer or tabes or contaminated food, and, at that particular moment, he does not care. He knows only that he is in pain and he is afraid of his pain and insistent upon relief. His attitude is highly unscientific but it presents the physician with a practical problem which demands immediate attention.

Fortunately, the ability to relieve pain is among the greatest attributes of the physician. It is usually palliative, it cures nothing, but without it his other skills aimed at restoring the affected organ or individual to normal would be given little chance to be brought into play. Further, when the nature or extent of the disease makes a direct attack fruitless, the ability persists to lessen pain and relieve suffering. So much of the physician's time and effort is devoted to the relief of pain that his capabilities in this respect are taken for granted both by his patients and himself. He will show far more interest in a discussion of a disease so rare that he may never see a case in his lifetime, than he will in a study of the relative effectiveness of a group of commonly used analgesics.

Pain may be relieved in a great many ways: by mechanical means such as immobilization with splints or casts; by the use of heat or water to lessen spasm; by a surgical attack either on the source of pain or by surgically interrupting pain circuits in the peripheral or central nervous systems; by the use of anesthetic agents acting locally, in the spinal cord, or centrally on cerebral function; by psychotherapeutic attempts to distract from the awareness of pain or to increase individual tolerance of pain; by the use of drugs which reduce the pain-producing ability of a given disease process; and finally by means of analgesic drugs. The method or methods of obtaining relief will depend on many factors, including the nature of the pain-producing disturbance, the experience and ability of the physician, the general condition of the patient, the physical and geographical circumstances under which treatment is begun and the availability of various modes of therapy.

Broadly speaking, the drugs which relieve pain may be divided into four classes: (1) those which act on the organ or tissue producing the pain, such as cortisone in rheumatoid arthritis and ergot derivatives in vasodilatory headache; (2) those which act locally to block the conductivity of pain fibers, such as subcutaneous injection of procaine and the cutaneous application of ethyl chloride; (3) the true anesthetics which produce unconsciousness and thus relieve the awareness of pain, such as ether or the intravenous use of the barbiturates; and (4) the analgesics, which selectively depress the central pain-appreciation areas without loss of consciousness, such as aspirin and morphine. Of these groups, the first is the method of choice, since it most nearly approaches a rational attempt to restore normal function. Its effective use is based on an accurate diagnosis (not always possible) and on the availability of a drug capable of reversing the pathologic changes. The group of analgesics is, however, the most often used because of their effectiveness, regardless of the cause of the pain, and because of their availability, ease of administration and low expense.

These very desirable qualities of the analgesic drugs contain an inherent danger. They encourage laxity in diagnosis by the busy practitioner who allows himself to feel satisfied when he relieves his patient of a severe obscure pain with an injection of morphine. When the cause of pain is undetermined, the giving of an analgesic must be considered by the conscientious physician as a temporary, humane expedient in the course of his search for the explanation of the pain, and not as an end in itself. To ignore this seemingly obvious principle constitutes negligence on the part of the physician, who thus endangers the welfare of his patient.

The commonly used and practically valuable analgesic drugs may be divided into two groups, depending on whether or not their repeated use can lead to addiction.

Among the non-narcotic analgesics, the *salicylates* lead the list, headed by acetylsalicylic acid. Aspirin can undoubtedly compare favorably with the vitamins as the tablet most freely taken by a drug-conscious public. It is estimated that 8.7 million pounds of aspirin were produced in the United States annually in the last decade.[3] In addition to its rational and highly effective use in the relief of the milder degrees of pain, the drug is employed extensively in the self-treatment by lay individuals of virtually every symptom, including such extremes as post-alcoholic drowsiness and insomnia of any cause. As a general rule, salicylates act more effectively on pains arising from integumental structures (arthralgia, myalgia, headache) than from the viscera. The analgesic strength of the salicylates is mild; the pain threshold is raised only 35 per cent by 1.8 grams (gr. xxv) of aspirin as compared to 70 per cent by 15 mg. (gr. ¼) of morphine.[6] However, the minimal side-effects, confined primarily to infrequent local gastro-intestinal irritation and occasional idiosyncrasy, justify its generous use in the majority of mild pains.

The salicylates act centrally, probably on the thalamus. There is no rationale for their use as a local anesthetic, as in gums and gargles for the pain of pharyngitis. The only benefit from such use arises entirely from the little that may be ingested and absorbed. They are excreted by all channels, especially the urine. Some 20 per cent is destroyed in the body. Salicylates may be given rectally as the sodium salt in a 2 per cent solution of thin starch if they cannot be tolerated orally. However, the situations in which such a procedure would be the analgesic of choice are rare.

The paraminophenol analgesics consist of *acetanalid* and *acetophenatedin* (phenacetin). Acetanalid was first introduced in 1886, but early reports of toxic reactions led to a search for better tolerated analgesics in the same chemical group, and resulted in the development of the now more widely used acetophenatedin.

The pyrazalon derivatives which include *aminopyrine* and *antipyrine* are mentioned only to condemn their use as clinical analgesics. The toxicity of these drugs in their ability to produce serious and occasionally fatal agranulocytosis is such as to make their clinical use unwarranted and foolhardy. They are admittedly the most effective of the non-narcotic oral analgesics. In their own group they stand at the head of the list in pain-relieving properties as does *heroin* among the narcotic analgesics. If the pyrazalon derivatives and heroin were the only available pain-relieving drugs, their need would justify their use despite the dangers. Fortunately, there is a sufficient range of less toxic analgesics to meet all practical needs. For this reason antipyrine and aminopyrine, like heroin, must be considered as having no place in clinical medicine.

A true synergism exists between these non-narcotics. Their use in combinations is justified and rational, either with each other or in combination with stimulants such as caffeine, hypnotics of the barbiturate group, or with stronger narcotic analgesics such as codeine. The combinations of aspirin, phenacetin and caffeine, and of codeine and aspirin, have proved clinically to be far more effective and no more toxic than equivalent doses of any of these singly.

The analgesic drugs discussed above constitute a first line of defense against pain. Their widespread use as self-medication by the general population for minor aches and pains is accompanied by surprisingly little abuse. Their analgesic strength is fortunately usually insufficient to keep comfortable the patient with the pain of serious disease. In such circumstances, the pain will lead him to call his physician, and thus, to an attempt at determining and correcting the underlying cause as well as relieving the symptom. For this reason, in addition to the danger of addiction, it is well that the more potent analgesics are restricted to use under medical supervision.

Among the narcotic analgesics, the opium alkaloids continue to enjoy the greatest use, and deservedly so. Improvements in the isolation and preparation of the individual alkaloids has lessened the need for the multiple opium preparations in the form of tinctures, extracts and powders of a generation ago. However, *morphine* and *codeine* remain to play a vital role in the relief of pain. Their analgesic potency is great, particularly morphine. The pain threshold is raised 50 per cent by 60 mg. of codeine, 71 per cent by 15 mg. of morphine and 93 per cent by 30 mg. of morphine.[6] It is interesting to note in these studies with the Hardy-Wolff-Goodell technique that 240 mg. of codeine raised the pain threshold no more than did 60 mg., 50 per cent in each case. Here is confirmation of the often overlooked concept that, if average doses of an analgesic prove insufficient, it is not only safer but more effective to change to a more potent drug than to increase the dose of the same analgesic.

The opium alkaloids can produce side effects which are undesirable from the standpoint of pure analgesia but useful for other purposes. For example, the sedative effect of morphine makes it valuable as a pre-anesthetic medication but dangerous in controlling the headache of increased intracranial pressure; the ability of codeine to control diarrhea is excellent but the stubborn constipation which accompanies its use for pain is most undesirable.

Both drugs are excreted by the kidneys, codeine in unchanged form, morphine after being detoxified by the liver. The existence of liver disease constitutes an absolute contraindication to the use of morphine, although codeine may be used. Morphine will appear in the milk of a nursing mother if large quantities are taken, and it readily crosses the placental barrier. As a result, stupefaction or even addiction may occur in the infant of a nursing mother-addict, and withdrawal symptoms have been reported in the newborn child of an addict.[2]

The contraindications to the opium alkaloids are few but must be well known to any physician prescribing them. Liver disease as a contraindication to morphine has been mentioned. Individuals in the extremes of life, particularly infants, are unduly susceptible to the central depressant action of morphine. The fact that morphine is a depressant of medullary centers makes its use dangerous in any case of increased intracranial pressure. A lowered metabolic rate will often lead to marked narcosis from average doses and it must be used with extreme caution in myxedema; conversely, patients with hyperthyroidism tolerate morphine well. Morphine both contracts bronchial musculature and depresses respiration; its use, therefore, in bronchial asthma is dangerous and it must be used with caution in other pulmonary disease. Because of its sedative effect plus its action to increase the tone of the bladder sphincter, morphine may precipitate acute urinary retention in patients with prostatic enlargement or urethral stricture. Idiosyncrasy to opium alkaloids occurs as it does to any drug. Nausea and vomiting after morphine is fairly common. When it occurs it can usually be prevented by a very small injection followed in one-half hour by the remaining fraction of the full therapeutic dose. Other idiosyncrasies include allergic phenomena such as pruritis, urticaria and sneezing. Tremors, insomnia, delirium and convulsions may occur rarely.

The obvious limitations and undesirable side-effects of the opium alkaloids have resulted in a prolonged search, particularly in this country and in Germany, for better synthetic analgesics. The perfect analgesic remains to be found: it must be capable of effective administration by all usual routes, both oral and parenteral; able to depress the pain-receptive areas of the brain completely, reversibly and specifically, without producing other depression of the central nervous system; possess a wide range between the effective therapeutic dose and the minimal toxic dose, as well as the ability to be excreted by many channels and/or totally destroyed in the body by several organs to permit its use in all diseases; and finally to be entirely devoid of side-effects, idiosyncrasies, tolerance, accumulation, or addiction. All the natural and synthetic analgesics possess several of these properties; none has them all. Many of the synthetic analgesics have enjoyed a brief popularity, only to be discarded because they failed to offer any improvement over the already well-established narcotics, or because their undesirable side-effects outweighed their obvious advantages. This is true in the case of heroin, a potent analgesic but too dangerous as a source of addiction. New analgesics are constantly being developed and made available to the physician. For the most part, he and his patients will benefit if he limits himself to the use of a small number of analgesics, the effectiveness and limitations of which he knows intimately through experience, rather than to give these up indiscriminately, in favor of every new drug which becomes available.

Among those synthetic analgesics which appear to deserve a place in present-day therapy may be mentioned the following: *Meperidine* (Demerol) was first synthesized in Germany. It is one-tenth as active as morphine but is relatively free of hypnotic action or respiratory depression. It can be given orally or by any parenteral route. It is suitable with scopolamine for obstetrical analgesia and promotes amnesia. While safer than morphine in the face of increased intracranial pressure, it is contraindicated in this condition because it produces miosis and a sluggish pupillary reflex, thereby interfering with the appearance of signs vital to the treatment of the underlying condition. The early erroneous impression that Demerol was free of addicting properties was most unfortunate and rapidly corrected; it has been our experience since the end of World War II that Demerol is the most commonly implicated drug in cases of addiction.

Dihydromorphinone hydrochloride (Dilaudid) is therapeutically effective and toxic in doses approximately one-fifth that of morphine. Like morphine it is a profound depressant of respiration but is free of sedative effect and has fewer side-reactions. It is not effective as pre-medication before anesthesia.

Methadone hydrochloride (Dolophine) presents certain advantages which warrant its increasing use. It has a longer lasting effect than morphine and is adequately absorbed when given orally. It possesses little sedative effect and considerably less central respiratory depression. Side reactions are less prominent than with morphine except for local irritation when given hypodermically or intramuscularly. Methadone should not be given intravenously. Addiction to methadone occurs, but more slowly than to morphine and the withdrawal symptoms are milder. Denton and Beecher[1] found respiratory depression to be as marked with methadone as with morphine; however, their findings were based on a study of healthy subjects using the Hardy-Wolff-Goodell technique. Discrepancies between findings in healthy individuals by this technique and clinical experience with ill patients indicate the need for caution in drawing practically useful conclusions from such studies. In patients with increased intracranial pressure, methadone must admittedly be used cautiously, but it is the drug of choice when pain in this group of patients cannot be controlled with codeine. In such patients it may produce an apparent sedative effect by relieving pain, and in this manner may be very effective in the extremely restless semi-conscious individual suffering from head injury, brain tumor or intracranial hemorrhage. Its lack of true sedative action, however, makes methadone useless in obstetrical or pre-anesthetic analgesia.

The majority of human suffering can be temporarily lessened by the proper use of the above-mentioned analgesics. There are, however, certain painful conditions which are notoriously resistant to relief by even the strongest opiates. These include the root pains of herpes zoster, tabetic crises involving the legs or abdomen, trifacial neuralgia, pain arising from lesions in the thalamus, and the phantom limb pain sometimes seen after amputations. The number of drugs and procedures recommended for the relief of these various pains is evidence of the general ineffectiveness of their control by medication. Recent reports[4] indicate encouraging results with proteolytic enzyme (Protamine) in the relief of tabetic and herpetic pain, but further experience is necessary before this can be properly evaluated. In many cases of this group, surgical interruption of the pain pathway between the site of the lesion and the frontal lobes of the brain must be done before satisfactory relief is obtained. Also in this group of pains resistant to most analgesics are the distressing leg and abdominal symptoms of withdrawal in addicted individuals. These respond only to the addicting drug, but very satisfactorily to this. The one notable exception is the effectiveness of methadone in controlling the withdrawal symptoms of morphine addicts.

Pains of psychogenic origin are extremely variable in their response to analgesics. This is true of pain as a conversion symptom in hysteria as well as the pain due to muscular hypertonus in anxiety neuroses. The former may respond better to a placebo than to full doses of morphine, depending on the circumstances under which each is given. The pain of anxiety-tension states will usually show a better response to sedatives or to peripheral muscle-relaxing drugs such as Myanesin than to analgesics. In fact it has been recommended that small doses of barbiturates be used intravenously to differentiate psychogenic from organic pain as a diagnostic test.[5] Such an injection, in doses well below those producing drowsiness, will completely abolish the pains of anxiety states (but not always the pain of conversion hysteria) while similar doses of barbiturates will have little or no effect on organically produced pain.

The proper selection of the most effective analgesic, in any given circumstance, depends on the consideration of a number of factors. The first of these is an estimate of the severity of the pain. It is as useless to give Phenacetin for the pain of coronary occlusion as it is foolish to give morphine for the discomfort of a mild headache. The second consideration is an evaluation of the side-effects and contraindications, including an awareness of the effect of the pain-producing illness on the excretion or destruction of the selected analgesic. If the contraindications are relative, the benefits to be obtained must be weighed against the risks taken. Much has been written and taught concerning the dangers of masking symptoms by the use of analgesics, especially in acute abdominal conditions; however, in some cases of this sort the judicious relief of pain may facilitate diagnosis by permitting a better history and examination of a more cooperative patient. The side-effects may be so undesirable as to preclude the use of a drug in one case and yet make it the drug of choice in another, where a single analgesic may both relieve pain and alleviate other distressing symptoms such as cough, diarrhea or restlessness. Thirdly, one must weigh carefully the purpose to which the analgesic is to be put and estimate the probable length of need. The dangers of addiction in acute traumatic or postoperative cases are negligible in contrast to chronic recurring pains such as migraine. In the latter, the use of addicting analgesics is dangerous and a definite hazard to the patient. In certain cases, notably inoperable carcinoma, the severity of the pain and the hopeless prognosis justify the use of narcotics to the point of producing addiction. When the intentional and unavoidable production of addiction is thus indicated, the physician is well advised to keep careful records of the need for so serious a step, his awareness and acceptance of the dangers involved and, whenever possible, consultation with another physician before undertaking it. The frequent shifting from one narcotic to another, in such cases, will postpone the appearance of addiction and tolerance and will permit better analgesia with smaller doses. As a working rule of thumb, it may be stated that the more potent an analgesic, the more rapidly will it produce addiction and the more severe will be the withdrawal symptoms. The outstanding exception is methadone, one of the most potent analgesics, yet relatively slow to lead to addiction and mild in its withdrawal symptoms.

In considering the narcotic drugs, a word of warning is indicated concerning the patient unknown personally to the physician, often a transient, who comes to the doctor's office complaining of severe pain (frequently sciatica) and requesting something to control it until he can get home to his regular physician. This time-honored trick of addicts, to enlarge safely their supply of full-strength narcotics at standard pharmacy prices, instead of obtaining adulterated drugs at considerable risk and expense from peddlers, takes full advantage of the busy physician. In such circumstances, unless the physician carefully examines the patient and is reasonably convinced the pain is bona fide and of sufficient severity to justify the prescription of narcotics, he is committing a violation of the Harrison Act and liable to prosecution.

To conclude, it should be emphasized that the analgesic drugs are subject to the greatest effective use and frequent abuse by the medical profession. If they are employed intelligently, the physician will come most nearly to fulfilling that phase of medical practice which, to the patient and his family, is of prime importance—the relief of pain.

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THE IOWA STATE UNIVERSITY—MEDICAL DEPARTMENT, has eighty students, "material" is abundant, and everything is passing off well. The present term closes on the first Wednesday in March; there are thirty-five candidates for the degree.

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Relief of Pain in Surgical Operations and Obstetrics

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ANALGESIA is the absence of pain. *Anesthesia* is the absence of sensation.

The first purpose of any anesthetic procedure is to create unawareness of any painful stimulation. The second purpose is to accomplish quietness and if need be relaxation for the surgery. The third purpose, greatly emphasized today, is to maintain the physiology as nearly normal as possible, by avoiding disturbances of physiology and by correcting them if they do occur.

Blocking of sensory nerves can provide pain relief for practically any part of the body. Each sensory branch of any of the cranial nerves which have a sensory function can be reached at a satisfactory and accessible landmark. The spinal nerves can all be reached paravertebrally as they leave the spinal canal, the last four cervicals still better as the cords of the plexus cross the first rib. Many nerves can well be reached also at various points along their course.

A certain amount of training and skill are required to do nerve blocking, but these are certainly not unattainable. The first necessary knowledge deals with which cranial nerves and which spinal nerves supply each region of the body. The second is concerned with the anatomy of the bony structure at the points of exit of these nerves or at the nearest points of access. The third deals with the surface anatomy in relation to the bony landmarks and certainly the knowledge of neighboring vulnerable structures. The fourth embraces mental and manual skill in manipulating needles in search of landmarks. The fifth is the knowledge of anesthetic drugs, the necessary concentrations and quantities to use for various nerves, the rapidity and duration of action, the toxicities, etc.

The fourth factor, skill with a needle, should be dwelt upon a little further. This is a special skill which must be deliberately and painstakingly developed. A skillful and adroit surgeon may be a poor needle man but he can become the best of needle men. The needle must be advanced precisely and gently, especially when approaching bone. When the direction must be changed it must first be withdrawn adequately and advanced again precisely in the new direction without bending the needle. The search must be rapid and systematic but always gentle. When one has learned to do one nerve block well it becomes immensely easier to learn to do blocks of other nerves.

It is not within the scope of this brief discussion to describe in any detail the technique of blocking any individual nerves. A number of good texts and individual papers are available for these descriptions. It suffices here to say that:

The fifth cranial can be blocked in the foramen ovale.
  The ophthalmic branch can be reached by retrobulbar injection in the orbit.
  The maxillary branch can be blocked 0.5 cm. deeper than the anterior margin of the pterygoid plate.
  The mandibular and lingual branches can be blocked 0.5 cm. deeper than the posterior margin of the pterygoid plate or trans-orally on the inner surface of the ascending ramus of the mandible.
  Terminal branches of the above nerves can be blocked at the supraorbital, infraorbital and mental foramina.

The glossopharyngeal nerve can be blocked by infiltrating the base of the tongue from below the mandible.

The upper four cervical nerves can be blocked by injecting upon the tips of the transverse processes.

The lower four cervicals can best be blocked as they cross the first rib above the mid portion of the clavicle in the form of the brachial plexus.

The thoracic nerves can be blocked as they make their exits from their intervertebral foramina or at points along and beneath their respective ribs.

The lumbar and sacral nerves can be blocked at their intervertebral foramina.

In the upper extremity the nerves can be blocked individually at the elbow and at the wrist.

For the lower extremity the lateral cutaneous may be blocked subcutaneously below the anterior superior spine of the ilium, the femoral in the femoral canal just lateral to the femoral artery, the obturator as it emerges from the obturator foramen and the sciatic as it emerges from the greater sciatic notch. The sciatic may again be blocked at the apex of the popliteal space, the anterior tibial at the head of the fibula and again in the front of the ankle and the posterior tibial just medial to the Achilles tendon and deep on the tibia.

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For the perineum the pudendal nerve may be blocked by passing the needle just medial to the tuberosity and depositing the solution at the spine of the ischium.

Zones of anesthesia consisting of the nerve distribution of several spinal segments may very well be blocked en masse by the peridural deposit of solution in the spinal canal. For the lower area of the body this may be accomplished through the caudal hiatus and by increasing the volume of solution the anesthesia may be extended upward. Zones of four to eight segments of anesthesia may be accomplished in any area by inserting the needle at the center of the desired area.

In addition to all of the above possibilities for blocking nerve trunks, almost any region may be well anesthetized by a carefully deposited field block.

Procaine (Novocain) is still the drug most generally depended upon, used in concentrations from 0.5 per cent for generous infiltration to 2 per cent for blocking the larger nerves or for smaller nerves in situations in which it is desired to use a very small volume.

Many prefer to use Metycaine in the same concentrations because it is a more positive, faster and somewhat longer lasting drug. This is the preference of the writer. I have seen no evidence of its being more toxic than procaine. Some anesthesiologists who are now doing the most work and the most writing concerning the more general use of regional anesthesia are favoring Pontocaine 0.1 per cent or 0.2 per cent, often with 0.5 per cent or 1 per cent procaine added. Pontocaine gives a much longer lasting block and if procaine is added the slower onset of Pontocaine is avoided.

Xylocaine is a much newer local anesthetic drug which is being highly recommended by some who have now used it extensively. Its toxicity seems to be low and its effectiveness high. The writer has as yet had no experience with it but it seems to have promise.

Epinephrin is added to the solutions to make a strength of 1–260,000. An ampul of 1 cc. of 1–2600 is added to 100 cc. of solution. This is sufficient to retard absorption and prolong anesthesia but weak enough to avoid any untoward epinephrin reaction.

There is a great satisfaction in performing good regional anesthesia and in doing good surgery under its protection. Many patients may be operated upon with much less interference with their physiology. If conditions are quite perfect, as they may usually be, all is well. If the patient is somewhat uncomfortable and unhappy, a little added local infiltration often makes the situation entirely satisfactory. If not, then very light general anesthesia for unconsciousnss does make it so. It should be said that never should a patient be cajoled and forced into tolerating an uncomfortable situation. And the surgeon should not feel that the attempt has been a failure if unconsciousness becomes necessary or advisable, because deep general anesthesia, which is more prostrating than most surgery, has been avoided.

Spinal anesthesia is an excellent choice under many circumstances. It must not be entered into lightly. It carries many hazards, some of which are more tragic than death. Its safety depends almost entirely upon the knowledge and skill of the anesthetist. The dura must be entered without trauma. Every possible precaution must be taken to avoid the injection of harmful chemicals. This includes antiseptics, especially formalin, which may have entered the ampul through a defect. It also includes too high a concentration of the anesthetic drug and pooling of the anesthetic solution because of too slow injection so that immediate dilution by the spinal fluid is inhibited. This concentration is undoubtedly the most frequent cause of damage to spinal cord and nerve roots. Throughout spinal anesthesia the physiology must be cared for meticulously. Blood pressure must be kept at approximately the patient's usual level. Ideas of "critical levels" should be abandoned. Respiration should be known to be adequate. Oxygen should be given freely. If there is the slightest suspicion that the volume of respiration is not entirely adequate it should be assisted manually with the bag. Spinal anesthesia should never be administered without an apparatus at hand, and in good order, for assisting the respiration with oxygen.

The drugs used for spinal anesthesia are those named above for regional anesthesia. No concentrations should ever be injected higher than 5 per cent procaine, 3 per cent Metycaine, 0.3 per cent to 0.5 per cent Pontocaine, and the solution should be injected at least ½ cc. per second, never more slowly.

There should be the same consideration for unconsciousness as with regional anesthesia.

General anesthesia has made great strides in improvement. The first choice of agent and method should still be the one with which the anesthetist is skilled. It is folly to select one which would otherwise be a better choice if the anesthetist is not skilled in its use. But if there are better choices the anesthetist should become familiar with them.

Ether is subject to much just criticism but is a good anesthetic. Most of its faults, which are evidences of toxicity, are reduced to a minimum or eliminated by the adequate administration of oxygen, adequate ventilation and adequate removal of carbon dioxide, plus the avoidance of higher blood concentration of ether than is absolutely necessary. It presents the problem of explosiveness. Divinyl ether is often used for induction before ethyl ether and for extremely short surgical procedures. It is an improvement over ethyl ether in pleasantness but still leaves much to be desired.

Nitrous oxide and ethylene, though very weak anesthetics, now have a greater place than ever in anesthesia as adjuvants to other agents. In this role they are not called upon for any profound effect but may be used with very adequate oxygen to supplement the effect and reduce the necessary amount of other drugs in balanced anesthesia. Usually nitrous oxide is the choice for this purpose because it is non-inflammable, but occasionally ethylene may be substituted when a slightly more potent effect is needed. It presents the problem of explosiveness.

Cyclopropane has much to recommend it. It produces unconsciousness smoothly and pleasantly. It produces relaxation almost comparable to that of ether. It is so potent that it can do this in the presence of a very high per cent of oxygen. However, it requires real skill to use it at all safely. Dangerously deep levels of anesthesia can develop very rapidly. The troublesome effect upon the cardiac conduction mechanism must be anticipated and watched with great vigilance. Then, too, there is the explosion hazard.

Pentothal Sodium, now spoken of as Thiopental Sodium, used intravenously, is the most delightful induction agent we have ever had. However, it is strictly a good hypnotic and not an anesthetic. It does not depress reflexes nor produce relaxation well except when administered in a dose which produces prolonged and profound cerebral and medullary depression. If used only to maintain unconsciousness it fulfills a high purpose. Nitrous oxide or ethylene can then be used with it to assist with the hypnosis and to add a considerable degree of analgesia.

For many children and for adults whose veins are very difficult to find it is often better to induce unconsciousness with cyclopropane. The veins are then more dilated and easier to find and anesthesia may then be carried on with Pentothal Sodium and adjuvants.

Curare is an adjuvant drug which has now been available to us for almost nine years. It has no anesthetic or analgesic properties but it performs well a service which general anesthetics have always been called upon to provide and which none of them have been well qualified to perform except with relatively harmful doses. Relaxation is produced by curare with complete efficiency. Thus a patient may be anesthetized only into unconsciousness by means of a general anesthetic and whatever degree of quietness or relaxation is necessary can then be added by the adjuvant use of curare. It was first used in anesthesia as an adjuvant to cyclopropane. Then it was used with Thiopental, with nitrous oxide, with ethylene and with combinations of them. It may also be used cautiously with ether but the dose must be reduced and very carefully regulated.

For a very pleasant induction especially for children, it is well to instill into the rectum a 2.5 per cent solution of Pentothal Sodium, one-half cubic centimeter per pound. Sleep comes on in a few minutes and may be sufficiently deep to allow certain minor surgical procedures. Avertin up to a dose of 100 mg. per kilogram of weight may be used in the same way but is less convenient to prepare. The anesthesia may then be supplemented in any way desired.

Now we have considered the first two requisites of anesthesia, unconsciousness and relaxation. The third must not be forgotten or we will have failed in our greatest trust. It is of little avail to give the patient the gift of unawareness of pain if we do not maintain for him a healthy physiological state.

Lost blood must be replaced.

The vascular bed must be kept in tone.

The cardiac action must be kept at its best.

For the vascular bed and the heart the best treatment is to keep the respiratory function at its best. That is, the atmosphere entering the lungs must be rich in oxygen, the respiratory excursions must be amply deep and frequent so that carbon dioxide is very adequately removed. It is becoming increasingly apparent to us that under general anesthesia of any kind or in any stage the carbon dioxide is rarely as low as normal. The blood carbon dioxide rises and the *p*H falls. This is one of the chief causes of shock and of cardiac, hormonal and central nervous difficulties related to surgery. Respiratory excursions should therefore almost always be increased by manual compression of the bag.

In obstetrics I believe that the main obstacle to complete pain control is an economic one. Certainly we have the knowledge and the equipment to accomplish this but to do so would require professional attendance upon the patient many hours for pain relief and for the maintenance of good physiology. A short-cut to pain relief has too often been accompanied by bad physiology with disastrous results. Obstetrical pain relief has therefore been classed as dangerous. People are as yet unprepared or unwilling to pay the price of long attendance to avoid the danger and still to have pain relief.

Caudal anesthesia properly administered and properly regulated can provide wonderful absence of pain without interfering with labor.

Paracervical injection into the broad ligaments plus pudendal block can do the same and can be repeated as needed.

The mother should be given as little general sedation as is possible to avoid sleepiness of the baby and to keep the mother's respiration at a high normal so that oxygenation and carbon dioxide removal will be very adequate for the baby. If the baby's medulla becomes accustomed to increased levels of carbon dioxide during labor it will not respond well when called upon to do its own breathing.

Intermittent administration of some general anesthetic such as nitrous oxide, ethylene or cyclopropane, for analgesia but not unconsciousness, can bring about satisfactory pain relief without depressing the baby if started early in labor and used in place of any sedative drugs. This again requires long, expensive attendance.

In conclusion, by the skillful use of all of the methods discussed, there is available for both surgery and obstetrics the unawareness of pain, the unawareness of all surroundings if that is desired, relaxation to whatever extent necessary, and the maintenance of good physiology.

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Aspects of Pain Therapy

Pain should be relieved sympathetically and systematically but not by routine or sentimental use of powerful narcotics. A great variety of distressing symptoms can be alleviated by nerve block or nerve section. E. M. Papper, M.D., of Columbia University, New York City, classifies painful states in four broad groups: organic tissue change such as trauma; lesions involving nerve pathways, including neuralgia and neuritis; smooth muscle spasm in digestive or other systems; and psychic or emotional conditions.

As a general rule, burning, sharp, itching, or stabbing pain is superficial and stimulates an active response. The person with toothache or an injury wants the affected part removed or repaired at once. Aching, throbbing, or gnawing sensations arise in deep viscera and the victim desires to be left alone.

Ability to bear pain varies among individuals and in the same subject from time to time. Awareness may be blunted by distracting events or excitement and sharpened by long illness and the strain of chronic disease.

Treatment should be carried out in one or more directions: (1) The first object is to remove the pain stimulus if possible. (2) Symptoms, if not the underlying disease, may be relieved by chemical or surgical interruption of pain pathways. Lesions suitable for nerve block or section are listed. Unless the general practitioner has been specially trained, procedures are usually left to the surgeon or anesthetist. (3) The pain threshold may be raised by morphine or derivatives and substitutes, used sparingly and in small doses. (4) Emotion should be calmed by kindness, reassurance, a clear explanation of the problem, or analgesic drugs. Opiates, an alcoholic drink, scopolamine, or barbiturates may be helpful. (5) Several specific remedies are available. Curare reduces painful spasm in poliomyelitis, and ergotamine overcomes vascular pulsations of migraine. Colchicine is employed in gout, salicylates in rheumatic fever, nitroglycerin for angina, and cobra venom for a number of syndromes.

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Diagnostic and Therapeutic Nerve Blocks

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Diagnostic nerve blocks are performed for the purpose of locating pathways of pain. Therapeutic nerve blocks are performed to interrupt pathways of pain either semipermanently or permanently. Prognostic nerve blocks are performed to give the patient the opportunity of temporarily experiencing the effects of interruption of a nerve before the interruption is made permanent or semipermanent.

Purpose. Ideally, when a patient seeks relief of pain his doctor hopes to diagnose the cause of the pain and to eliminate it. If it is impossible either to locate the cause or to remove it, then the second choice is to locate the nerve pathway over which the impulses to be perceived as pain are passing and to interrupt this pathway.

Conditioning the Patient. As in most other things, the physician will accomplish results with diagnostic and therapeutic blocks commensurate with the time and thought which he devotes to them. There is more involved than merely the performance of a technical procedure. The physician must search out the information necessary to allow him to understand clearly the individual problems of his patient. The procedure must be planned on a sound anatomic and physiologic basis. Experience is necessary for correct interpretation of the results of the block.

Strange as it may seem, the patient must be conditioned for diagnostic or therapeutic block. The purpose of the block, a general outline of the procedure, and the expected results must be clearly explained to the patient and he must be coached in the part he is to play, particularly in regard to the correct interpretation of paresthesias and sensations of pain. As the physician gets the history of the pain he becomes acquainted with the patient, feels out his emotional make-up and gets to understand his personality. What is more important, the physician gets the opportunity to win the confidence of the patient. It has been evident that the results in the same patient following identical blocks by two different physicians of equal technical ability may be quite different, depending on the attitude of the patient toward the two different doctors.

Psychologic factors are important in securing good results from diagnostic and therapeutic blocks even though the pain may be attributable to a definite lesion. The psychic and emotional changes resulting from pain are even more poorly understood than the physiology of pain. In a percentage of patients to be given diagnostic nerve blocks, no reasonable cause for the pain of which the patient complains can be demonstrated even after exhaustive examination and laboratory study. Many of these patients have been suspected of being psychoneurotic but their pain is still acute and the psychologic approach is important. With careful observation on the part of the physician plus the information obtained from nerve block, definite physical factors may be discovered to explain either partly or wholly the patient's complaint of pain.

The patient should be questioned closely concerning the size and frequency of the dose of pain-relieving drugs which he has been taking. Such information gives an indication of the severity of the pain and discloses whether there may be an associated drug addiction. Results from therapeutic blocks are frequently unsatisfactory in patients addicted to opiates unless the addiction is first eliminated; however, the relief of a severe pain may facilitate the treatment of the addiction. The results of nerve blocks on patients with drug addiction are much more difficult to evaluate than are those on patients not addicted.

Examination. Even though the patient may have had numerous previous examinations by diagnosticians whom the physician considers more experienced than himself, the one who is to do the nerve block must still perform his own examination. It is well to have the patient outline the exact location of his pain, preferably with one finger. If there is associated tenderness the patient should be asked to locate the area or areas of tenderness several times as the anesthesiologist palpates or presses with a finger when the patient cannot see the area. Sometimes tenderness which at first seemed to be localized to a small area is found to be more diffuse, and the point of maximal tenderness may vary with each attempt at localization. An effort should be made to perform an extensive enough block to eliminate all tenderness and pain. The patient's tolerance for pain should be determined and recorded.

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The block should preferably be performed when the pain is present or else the effect may be uncertain. Exceptions may be made when the patient is able to demonstrate that he can bring on the pain at will by some manipulation or irritation of a "trigger" area. Patients who have been having almost continuous pain may wait hours in the operating room for the pain to appear, and sometimes it may be necessary to have the patient go back home with instructions to return immediately when the pain reappears.

Fitting the Procedure to the Patient. With all the possible information available, the physician is ready to plan the diagnostic and therapeutic procedures indicated in the individual case. On the basis of anatomic, physiologic, pathologic and psychologic principles the types of nerve blocks which may be beneficial can be determined and the order in which these indicated blocks should be done can be outlined. The patient should be warned that a series of blocks may be necessary.

The first block may furnish the information being sought or give the desired result, or it may indicate that a procedure other than that originally planned should be followed. In any event the physician should start the treatment of the patient with a logical outline in mind. Time must be taken to discuss the intended procedures with the patient and to inform him about what may be accomplished and what is being sought in the way of information. Since the subjective symptoms of the patient are to a large extent going to be the decisive factor in the success of the block, any time spent in securing his co-operation is worth while. When it is explained beforehand that a series of blocks may be necessary and that no definite prognosis concerning the efficacy of the treatment can be made at the first visit, the patient is less likely to become discouraged before all the treatment has been completed. The attitude of the anesthesiologist must be one of optimism and sympathy. If the patient feels that a sincere attempt is being made to give him relief, he will become enthusiastic about the procedure and freely give his necessary co-operation even though the blocks themselves are somewhat painful. On the other hand, the patient is quick to sense an attitude on the part of the physician that the blocks are not going to be of any material benefit and are being performed just because nothing more promising is available. The difference in the results of various physicians with diagnostic and therapeutic blocks lies in the ability of each to convince the patient of his sincerity.

Sometimes several blocks may be performed at one visit or the same block may be performed in stages with a short waiting period between stages to determine the effect of the previous injection. In the case of unexplained pain in the abdomen, for example, for which diagnostic block is to be used, the physician might first begin with a subcutaneous injection of local anesthetic agent over the site of pain. If this should afford no relief after fifteen minutes, the injection might then be carried deeper into the fascia and muscles. If no relief should occur from this deep block, the abdominal wall including the parietal peritoneum might be ruled out as the source of pain by the performance of an effective block of the indicated intercostal or lumbar nerve roots. If one is certain that the block has been complete and still the abdominal pain persists, paravertebral block of the splanchnic nerves or subarachnoid block may be indicated at a later date. The attempt to do too much at one visit may so discourage the patient that he will fear to return.

Follow-up Observation. It cannot be too strongly emphasized that the patient must return for observation by the doctor who performed the block, or in the case of a hospital patient the doctor must make regular visits to see the patient after the block. If the patient reports only to a referring surgeon or internist who may not understand the outline of further treatment intended by the physician performing the blocks, the planned regimen is too frequently not completed. It may be advantageous for the referring physician to examine the patient while the nerve block is effective but the patient must return to the anesthesiologist for observation, especially as to the duration of effectiveness of the block. When the anesthesiologist is ready to discharge the patient permanently it must be made clear that the patient is to return to the referring physician and that a full account of the procedures employed, results obtained, information secured and recommendations of the anesthesiologist will reach the referring physicians through private channels. An understanding between the referring physician and the anesthesiologist of the problems of each other is greatly to be desired.

Diagnostic blocks are performed for the purpose of obtaining information and it is unjust to consider the block a failure if the patient's pain is not relieved for a considerable period of time. Frequently the pain is relieved for a longer period of time than the expected duration of effect of the anesthetic agent used, and such results are sometimes difficult to explain. As has been said before, pain as a symptom is not well understood and when more about its physiology and its psychologic effects has been discovered, the reason for these persistent effects of diagnostic blocks may be evident. Whether the relief from pain is persistent or not, or even if pain never occurs, the anesthesiologist may be able to gather much valuable information from the performance of a diagnostic nerve block.

Reaction of the Patient. The reaction of the patient to the standard amount of discomfort occurring during the production of a cutaneous wheal will give an indication as to the sensitivity of that particular patient to pain. Some gross idea about the severity of the symptoms of pain of which the patient is complaining will be gained. The character and distribution of the paresthesia produced by the passage of a needle or the injection of a mildly irritating anesthetic solution near a nerve are important. The interpretation and description of these paresthesias can be given only by the patient himself, and this is the reason for securing the whole-hearted co-operation of the patient and briefing him, before the block, about what will be expected of him. If these paresthesias occur as a surprise to him, he is apt to be so alarmed that he is incapable of clear thinking. Before the block is started the anesthesiologist must explain the procedure to be executed and impress the patient with the importance of his task in determining whether these paresthesias produce or exaggerate his old pain or the pain for which the block is being performed.

When several nerve roots are being blocked in an effort to determine the pathway being followed by painful nerve impulses to the central nervous system, the patient may be able to state that paresthesias produced by the insertion of a needle near certain nerves are above or below the site of his original pain or are similar or dissimilar to the old pain. When the paresthesias occur at the site of the original pain more solution or a longer-acting local anesthetic agent may be injected in an effort to produce a more prolonged interruption of the path the pain follows.

Interpreting Relief of Pain. The interpretation of duration of relief from pain following diagnostic and therapeutic blocks is helpful in determining the diagnosis, in making a prognosis and in deciding what other types of nerve blocks are indicated. Ordinarily the relief following injections of an anesthetic agent such as procaine hydrochloride is not expected to persist for more than two or three hours. As has already been mentioned, the relief following such blocks may persist for long periods of time and may even be permanent, but it is difficult to eliminate the psychic factor from such prolonged effects and, hence, the prognosis should be guarded. In case the pain does return in such patients after a prolonged period, additional injections of the same solution may be tried but, as a rule, the results will not be as satisfactory as those following the original block. Surgeons are not inclined to consider procedures for the permanent interruption of a nerve in such patients as readily as in those who are relieved of pain only for the time interval expected following use of the anesthetic agent.

Determining Nerves Blocked. Since diagnostic blocks may need to be accurately repeated with long-lasting agents, or since such permanent procedures as section of a nerve may be considered on the basis of the information derived from diagnostic blocks, some objective method for determining the nerve or nerves blocked is necessary. The landmarks generally used for locating nerves, vertebrae and ribs for anesthetization with large amounts of short-acting agents prior to surgical procedures are too indefinite.

Roentgenograms have been found to be the most satisfactory means of determining exactly where the point of the needle lies.[1] Usually anteroposterior and lateral exposures are necessary to determine the depth of the point of the needle as well as its location. The physician who has never checked the position of his needles during a block of nerves lying deep beneath the skin will be difficult to convince that the point of a needle could be so far removed from the place where he had judged it to be from observation of the visible portion of the needle above the skin. Not only are roentgenograms a valuable aid in the accurate performance of nerve blocks, but also they provide a record so that the identical block may be repeated even by a different doctor.

AGENTS

Blocks of Short Duration. For diagnostic and prognostic blocks that are to be completely reversible and of short duration, most of the water-soluble agents commonly used for surgical anesthesia are satisfactory. Procaine hydrochloride in a 1 or 2 per cent concentration with or without epinephrine is the standard agent.

Prolonged Blocks. For selective blocking of certain types of nerve fibers and for the accomplishment of blocks of long duration, the selection of the anesthetic agent to be used becomes increasingly complex and unsatisfactory. The use of solutions of ammonium salts for the purpose of blocking only the C fibers in somatic nerves has been advocated. These C fibers may conduct impulses which are eventually perceived as pain of indefinite location. The A and B nerve fibers which transmit other sensory impulses and the motor impulses are supposed to be little affected by the solutions of ammonium salts which have been recommended. One preparation containing 0.75 per cent solution of ammonium sulfate and 0.75 per cent solution of benzyl alcohol in isotonic solution (Dolamin, Harvey Laboratories) has been used with variable success. With this preparation many patients have been relieved of their pain for variable periods of time without numbness in the area of distribution of the nerve blocked and without loss of motor power. Other patients, however, have not experienced such satisfactory results, and the effects cannot be predicted either as to completeness or duration. The subarachnoid injection of solutions of ammonium salts is not advisable since permanent lesions of the cauda equina have occurred following use of this method. Solutions of ammonium sulfate as concentrated as 5 per cent have been used for nerve block by tissue infiltration without appreciably increasing the effectiveness or duration of the block.

There is some advantage in the use of benzyl alcohol in solutions that are stronger than 0.75 per cent to produce nerve blocks for a prolonged period. On the other hand, this agent is not readily soluble in water and it is likely that the injection of concentrations higher than 2 per cent may result in loss of sensory and motor function and may be followed by neuritis of somatic nerves similar to that following injection of strong concentrations of ethyl alcohol. In 1943 Duncan and Jarvis[2] showed that the prolonged anesthetic effect of most anesthetic-in-oil mixtures is due to their content of benzyl alcohol, which is usually 5 per cent. The injection of a 5 per cent solution of benzyl alcohol caused degeneration of a considerable number of fibers in the facial nerve of the cat, and a 10 per cent concentration destroyed almost all the fibers in this small nerve. In our experience the use of 0.75 to 2 per cent aqueous solutions of benzyl alcohol with 1 per cent procaine hydrochloride has been more satisfactory than have the commercial preparations of benzyl alcohol with fat-soluble anesthetic agents in oil. Not only is the anesthetic effect of the aqueous solution more efficacious but the disadvantages of pooling oil in the tissues are avoided.

If a patient with medical knowledge or with previous experience with diagnostic nerve blocks is likely to be influenced by the realization that effects of procaine persist for one to two hours, an agent such as tetracaine can be used to prolong the duration of the block. One of us (Pender) has used 0.1 to 0.2 per cent solutions of tetracaine hydrochloride with epinephrine in concentration of 1:260,000 to produce nerve blocks for four to six hours. Except for the advantage mentioned, the longer block of somatic nerves with tetracaine results in no better diagnostic or therapeutic effect. The longer duration obtained with the use of tetracaine does seem to have been of some advantage when block of sympathetic nerves has been carried out in the treatment of vascular disorders.

Permanent Blocks. Once the pathway of pain has been determined with short-acting agents, the patient may wish to have the effects of the block made permanent. Provided roentgenograms were taken at the time the diagnostic blocks were being carried out, prolongation of the original result can be obtained by surgical section of nerve fibers or by injection of other agents.

Absolute alcohol remains one of the most efficacious drugs for prolonged interruption of a nerve. In order to avoid dilution it is necessary for the injection of alcohol not to be preceded by the injection of a less irritating anesthetic agent. The pain caused by the injection of alcohol can be avoided by administering up to 10 cc. of a 2.5 per cent solution of thiopental sodium intravenously just before the alcohol is injected. By the time the patient begins to recover from the general anesthesia the worst pain of the injection will have passed. The nearer the tip of the needle is to the nerve to be blocked, the smaller will be the amount of alcohol neessary to produce the block and the less the amount of surrounding tissue that will be necrotized.

In order to limit the spread of the alcohol a technic called "spot wetting" has been found useful. By this technic only 0.5 cc. of absolute alcohol is injected at a time, and intervals of 20 to 30 seconds are allowed to elapse between injections.

The total volume of alcohol used for a single nerve is 2 to 5 cc., with the objective of using as small a volume as will effect the nerve block. The larger volume is necessary to block large nerves. Alcohol coagulates protein and does not tend to diffuse in the tissues to the distance that aqueous solutions do, but it can be forced to cover a larger area by rapid injection of larger volumes.

The injection of alcohol about a somatic nerve should not be considered except in cases in which the advantages are outstanding enough to justify the risk of postinjection neuritis. The incidence of neuritis following injection of alcohol varies with the technic employed, but no technic has been found which will entirely prevent this complication. The pain and disability of the neuritis may make the original preinjection disability inconsequential by comparison. Many patients who are candidates for therapeutic nerve blocks have psychosomatic disorders in addition, and the production of even mild neuritis may have exceptional consequences. In the patient with inoperable cancer whose life expectancy is short and who has constant severe pain, the exchange for the pain of even a severe neuritis might be advantageous.

The injection of sympathetic nerves with alcohol is attended with fewer complications than is the injection of somatic nerves. It is possible that most of the disability caused by injection of sympathetic nerves with alcohol may be due to the action of the alcohol on adjacent somatic nerves. This is another indication both for the use of roentgenograms in the accurate placement of the needles and for the use of small volumes of alcohol. A 6 per cent solution of phenol in water has been used in a few cases and has been found satisfactory; however, its use on somatic nerves cannot be recommended at this time.

Before a therapeutic nerve block of expected long duration is carried out on somatic nerves, a complete neurologic examination should be performed, if possible by a neurologic consultant. The record of such an examination serves to prevent any difference of memory between the physician and patient about the exact functional state of the nerves before they were blocked.

PROCEDURES

The success of any nerve block depends about equally on three basic factors: (1) the physician's understanding of the problem which he is trying to solve, be it one of diagnosis, therapeutics, or surgical anesthesia, (2) his knowledge of anatomy and (3) his experience with nerve-blocking procedures. Many and varied technics, equipment and approaches may be found lucidly described in many good textbooks and the reader is referred to them for details. Experience can be acquired only from performance, but the less experience a physician has had with nerve-blocking procedures, the greater will be the help he will derive from the use of roentgenograms in getting the needles properly placed.

The segmental distribution of nerves in the thoracic and abdominal wall is fairly regular and constant so that pathways of pain in these two parts of the body can be located by blocking the thoracic or lumbar somatic nerves paravertebrally at the site where they emerge from the intervertebral foramina, or peripherally. The intercostal nerves must be blocked posterior to the anterior axillary line in order for the block to be proximal to the site where the lateral perforating branch is given off. The somatic innervation of the extremities is rather irregular, and pathways of pain must be sought in the individual nerve trunks distally or in multiple segmental nerves in the cervical and lumbar regions.

The distribution of sympathetic nerves is more irregular than that of somatic nerves, and effective blocks are more frequently accomplished near the ends of the sympathetic trunk or about the splanchnic nerves. The injection of alcohol or phenol about sympathetic nerves is attended by fewer sequelae than the injection of these agents about somatic nerves, and some of our most satisfactory therapeutic blocks have been carried out on the sympathetic nerves. Since it would be impossible, in the space available, to describe all the clinical syndromes which lend themselves to the use of diagnostic and therapeutic nerve blocks, we shall comment on only four that have been of particular interest to us.

Block for Shoulder-hand Syndrome. Block of the stellate ganglion with absolute alcohol has been found to contribute to a plan of treatment of the shoulder-hand syndrome. This syndrome has many variations and is not a clear-cut medical or surgical entity, but in the advanced stages it is similar in some respects to causalgia.[3] The immobility of the extremity due to pain leads to increased fixation until finally edema and cutaneous hypersensitivity appear in the hand and forearm. Physiotherapy such as the use of heat, massage and active and passive motion is usually considered the treatment of choice, but in many cases the forearm and hand are so sensitive that effective physiotherapy cannot be carried out. The stellate ganglion can be blocked with procaine to decrease the cutaneous sensitivity and to increase the blood supply to the extremity before each manipulation, but since in many cases the treatment is prolonged, the number of blocks is excessive. In our experience block of the indicated stellate ganglion with alcohol gives better results and is conducive to better cooperation on the part of the patient than when repeated blocks with procaine are done. One successful block with absolute alcohol will persist on the average for several months, which allows time for adequate treatment of the extremity with physical or surgical methods.

Four approaches to the stellate ganglion are available: posterior, lateral, anterolateral and anterior. We have found that the anterolateral approach gives better results with fewer complications than do the other approaches. The tip of a left finger of the physician is made to exert downward pressure in the supraclavicular fossa of the patient above the junction of the medial and middle thirds of the clavicle. This serves to depress the dome of the pleura and helps to avoid pneumothorax. A needle 80 mm. or more in length is passed horizontally over the tip of the finger in the supraclavicular fossa in a medial and posterior direction. Usually at a depth of 1 to 2 cm. the tip of the needle strikes the lateral surface of the body of the first thoracic vertebra. Before alcohol is injected, the exact location of the tip of the needle must be verified with roentgenograms. In figure 1, needle "1", which was inserted first, would have been in good position for injecting procaine but, for alcohol, needle "2" was put in a better position and a good block resulted immediately. If the tip of the needle can be located so that its shadow in the anteroposterior view overlies the shadow of the articular process of the vertebra on the same side, the needle tip will be near the ganglion.

Drooping of the eyelid on the same side as the block will be persistent following a good block with alcohol, but this does not seem to concern the patient if he is told about it in advance; if he is not so forewarned, he is likely to believe that something has happened which should not have happened and it may be difficult or impossible to convince him otherwise. Block of the stellate ganglion is not offered as a cure for all cases of shoulder-hand syndrome but it contributes to the success of combined methods of treatment of this particular condition.

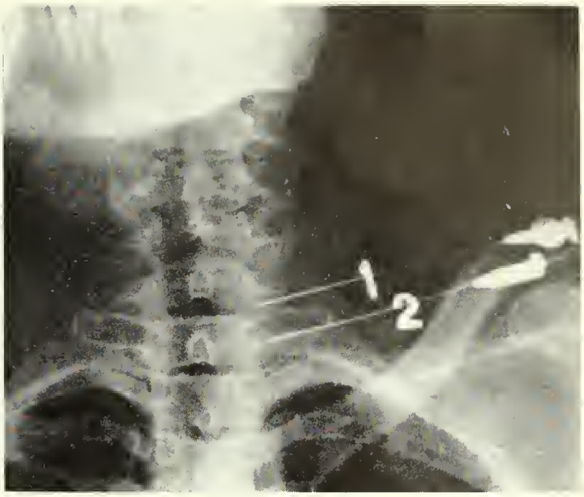

Fig. 1. Anteroposterior roentgenograms of needle in position for block of left stellate ganglion. Needle 1 is not in the best position, so needle 2 was inserted to a better position for injecting alcohol and a good block resulted immediately.

Block for Occlusive Vascular Disease of the Lower Extremity. The value of repeated blocks of lumbar sympathetic nerves with short-acting anesthetic agents has been widely recognized in the treatment of acute vascular diseases such as thrombophlebitis, phlebothrombosis and arterial embolus in the lower extremities. The chronic vascular disorders of the lower extremities have not been alleviated to the same extent by lumbar sympathetic block with short-acting agents; more extensive surgical procedures such as lumbar sympathectomy have been necessary to give relief.

Many of the patients suffering from chronic vascular disease of the lower extremities such as occlusive arteriosclerosis are elderly and have complicating disabilities, particularly diabetes mellitus, which make them poor surgical risks for an extensive surgical procedure. We have been doing blocks of lumbar sympathetic nerves on such people with absolute alcohol and with 6 per cent solution of phenol in water to produce a chemical disruption of the sympathetic nerve trunk for a prolonged period of time. The results have been gratifying in spite of the fact that the procedure is technically more difficult than a similar block with three to five times greater volume of a procaine solution which readily diffuses through the tissues. To patients the import of the procedure is less grave than is surgical sympathectomy and they have been more willing to accept it, especially when they know that they will not suffer any severe pain either during the procedure or afterward.

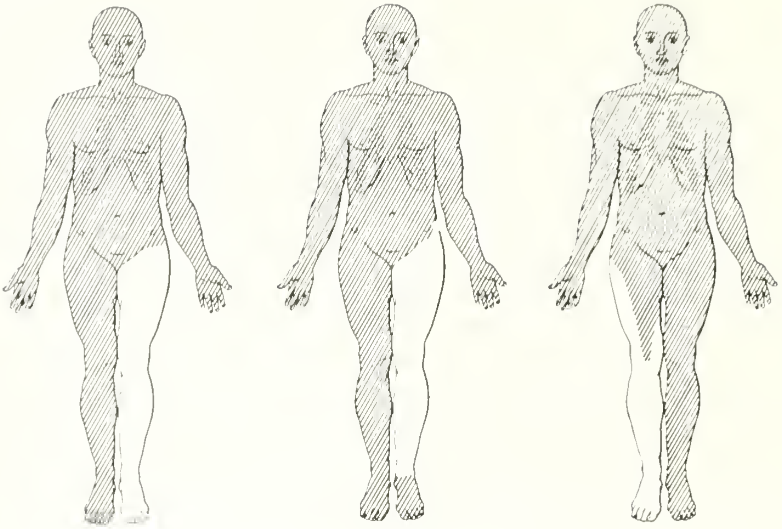

Fig. 2. Sweating patterns in three cases, following lumbar sympathetic block with absolute alcohol or with 6 per cent phenol in water. Sweating occurred in shaded areas only. Obviously the patterns varied among these patients.

When the procedure is to be carried out, thiopental sodium in 2.5 per cent solution may be given in small amounts intravenously to prevent the discomfort of the placement of the needles and the injection of the alcohol and still have the patient awake soon after the procedure is completed. An intravenously administered dose of 1/10 to 1/8 grain of morphine sulfate frequently is sufficient. Roentgenograms are used to determine when the tips of the needles have been placed in contact with the anterolateral surface of the bodies of the second and third lumbar vertebrae or, in some cases, only the third lumbar vertebra. Up to 4 cc. of absolute alcohol are injected through each needle, 0.5 cc. amounts being given at intervals of twenty to thirty seconds.

When the block is done with alcohol the change in temperature of the skin of the foot is not as rapid or dramatic as that which follows a block with procaine. For this reason an objective clinical evaluation of the effectiveness of the block has been difficult. In 76 of our cases a sweating test[4] has been performed within a couple of days after the block and the areas where sweating does not occur have been located. These nonsweating areas are those to which the sympathetic nerve supply has been blocked. In 5 cases the block was not considered satisfactory as judged by both the results of the sweating test and the clinical condition of the patient, so a repetition of the block was advised. In 24 cases the sweating test disclosed, in the extremity on the blocked side, spotty areas where sweating still occurred. These sweating areas were irregular in distribution and each patient exhibited an individual pattern (fig. 2). These irregular sweating patterns are known to occur even after extensive bilateral surgical thoracic and lumbar sympathectomy. No valid explanation for their occurrence has been made but their presence does not seem to detract from the clinical effectiveness of the block.

The duration of the block of the sympathetic trunk with alcohol seems to be variable. To date we have had the opportunity to repeat the sweating test on only 5 patients. Two showed no change in the pattern from that present immediately after the block, 2 showed partial recovery of innervation of the sweat glands and 1 showed almost complete recovery of innervation. Partial recovery had occurred in 1 patient at the end of one month while another patient showed no change in sweating after seven months. In order to avoid dissatisfaction at a later date each patient is made to understand that the good effects resulting from the block may last only a few months but it is possible that they may be permanent.

Block for Pancreatic Pain. Carcinoma, relapsing pancreatitis and other painful lesions of the pancreas frequently cannot be extirpated by surgical methods. Our experience in relieving pain of pancreatic origin by unilateral or bilateral splanchnic block has been gratifying. Needles 120 mm. in length are inserted just under the twelfth rib and passed in an anteromedial direction until the tips of the needles lie on the anterior surface of the body of the first lumbar vertebra or the twelfth thoracic vertebra (fig. 3). The injection of 10 to 20 cc. of 0.75 per cent solution of ammonium sulfate and 0.75 per cent

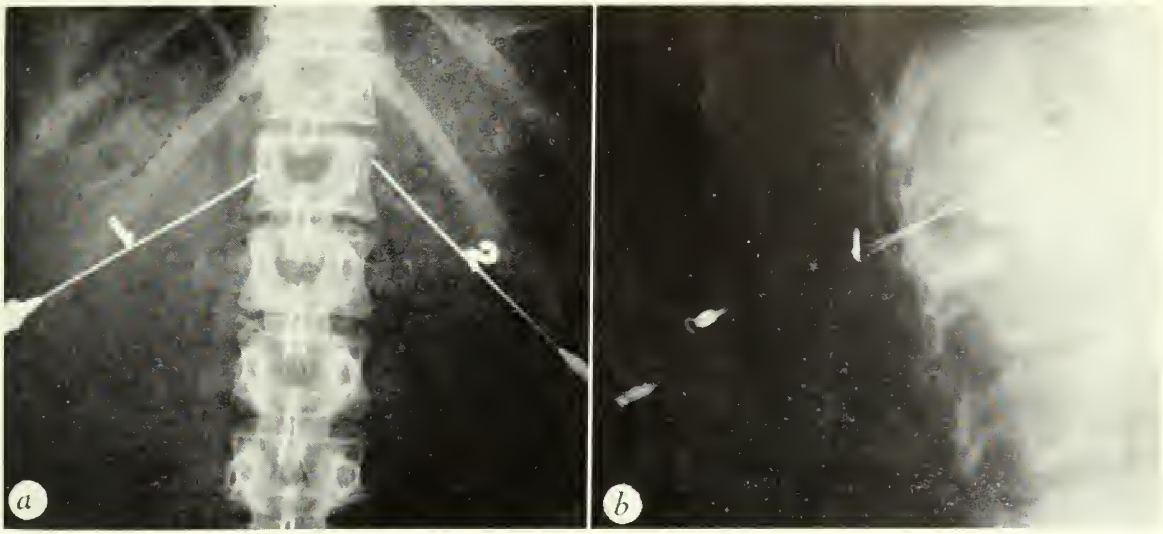

Fig. 3. Anteroposterior and lateral roentgenograms of thoracic and lumbar vertebra showing position of needles for block of splanchnic nerves. Injection of 10 cc. of an ammonium sulfate-benzyl alcohol solution through each needle gave ten months' relief of abdominal pain due to pancreatitis.

solution of benzyl alcohol usually aggravates the pancreatic pain for about half an hour and then gives relief. The duration of the relief is unpredictable, ranging from a few days to many months. If the pain returns, a second injection of the same solution is not likely to give relief of much longer duration than did the first injection, but the evidence of relief from pain given by the first injection offers good grounds for advising either injection of the same nerves with absolute alcohol or surgical splanchnicectomy. Both of these procedures have been used to afford lasting relief of pain in patients who had experienced only temporary relief from more conservative measures. Few patients are more grateful than those who have been relieved of their terrible constant abdominal pain.

Block for Hip Joint Pain. In 1950 one of us (Lundy) and associates[5] reported that blocking and sectioning the medial and lateral femoral cutaneous nerves gave satisfactory results in the relief of pain in the thigh associated with disease of the hip joint. Further experience has shown that the posterior femoral cutaneous nerve may be blocked and sectioned to alleviate pain in the posterior surface of the thigh.[6] This block is unusual in that nerve pathways from the actual site of the lesion are not attacked, but the pathways over which the sensations of pain apparently are referred are eliminated. The pain is usually associated with motion of the hip such as occurs in walking, and although after the block the patient may have some residual discomfort during walking, the amount of relief afforded will allow a satisfactory increase in activity. Immediately after the block of these nerves the patient may not be able to compare critically the pain present at that time to his memory of the pain as it was before the block. As the block regresses and the original pain returns, he will be able to evaluate accurately the relief afforded by the nerve block.

CONCLUSIONS

Diagnostic and therapeutic nerve blocks involve more than just the technic of injecting anesthetic agents. The success of this method of diagnosis and treatment depends also on the patience, perseverance and personality of the physician using it.

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Painful Conditions of the Upper Extremity

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The term "brachial neuritis" has been utilized to describe a multitude of different pathologic processes which cause pain in the upper extremities. Through the years, various syndromes have been identified and catalogued in an effort to simplify this complex problem. These various abnormal phenomena have received varying amounts of emphasis, and this has been particularly true of the scalenus anticus syndrome[1,2] in the past and, more recently, the syndrome of the protruded cervical disk.[3]

ANATOMY

In most cases, "brachial neuritis" is due to mechanical abnormalities rather than to inflammatory factors. Corbin,[4] in a recent communication, has outlined the anatomic basis for the more common types of brachial neuritis. It seems appropriate at this time to review briefly the anatomy of the brachial plexus and the sympathetic nerve supply of the upper extremity, because any proper evaluation of pain in this area implies knowledge of the nerve supply of the area. Practically speaking, the brachial plexus extends from the spinal cord to the inferior border of the pectoralis major muscle.[5] The usual arrangement of the plexus is as follows: the fifth, sixth, seventh and eighth cervical and first thoracic nerves form three primary trunks in the posterior triangle of the neck (figure 1). The fifth and sixth roots fuse to form the upper trunk; the seventh root comprises the middle trunk; and the eighth cervical and first thoracic roots form the lower trunk. These trunks are close to the foramina, and emerge from under the scalenus anticus muscle, essentially in the supraclavicular fossa.

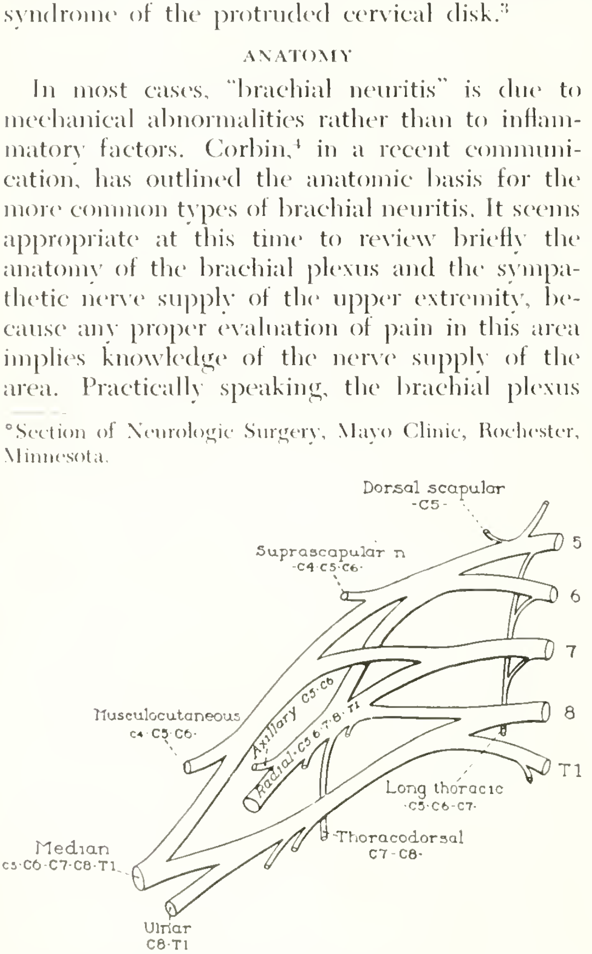

Fig. 1. The brachial plexus, showing the origin and formation of the principal peripheral nerves (Reproduced, with permission of the publishers, from: Craig, W. McK. and MacCarty, C. S.: Injuries to the Brachial Plexus. In Lewis, Dean and Walters, Waltman: Lewis' Practice of Surgery. Hagerstown, Maryland, W. F. Prior Company, Inc., 1951, vol. 3, chap. 7).

The secondary cords of the plexus which pass under the clavicle arise from the primary trunks. The posterior cord is formed by the posterior divisions of the trunks. The medial cord arises from the anterior root of the lower trunk. The lateral cord arises from the anterior roots of the upper and middle trunks. The posterior cord terminates as the axillary and radial nerves. The lateral cord terminates as the musculocutaneous nerve and lateral head of the median nerve. The medial cord forms the medial head of the median, ulnar, medial antibrachial cutaneous and medial brachial cutaneous nerves.

The preceding simplified description of the brachial plexus serves to present the outline of the unit with which we are dealing. Other nerves of diagnostic and surgical importance fit into this plan. The fifth cervical nerve sends a branch, the dorsal scapular nerve, to the rhomboid muscles. The fifth, sixth and seventh form the long thoracic nerve which supplies the serratus magnus muscle. The suprascapular nerve, derived chiefly from branches of the fifth and sixth nerves, lies on top of the plexus until it passes over the scapula to innervate the supraspinatus and infraspinatus muscles. The anterior thoracic nerves to the pectoral muscles arise from the lateral and medial cords. The subscapular nerves and thoracodorsal nerve come off the posterior cord to supply the subscapularis, latissimus dorsi and teres major muscles.

The sympathetic nerve supply of the upper extremities[6] (figure 2) is segmental in distribution. The preganglionic fibers arise in the second to the tenth thoracic spinal segments or thereabouts.

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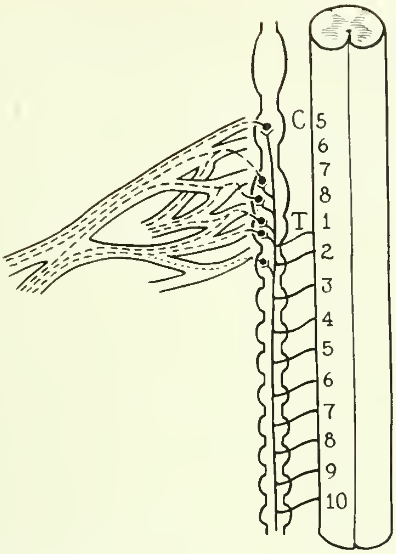

Fig. 2. The sympathetic nerve supply to the upper extremity. The preganglionic fibers originate in the lateral horns of the spinal cord from the first or second thoracic segment to approximately the tenth thoracic segment. The fibers ascend in the sympathetic trunk to the middle cervical, stellate and second thoracic ganglia. The postganglionic fibers originate here, and send their axons to the brachial plexus (Reproduced from: MacCarty, C. S.: Surgery of the Sympathetic Nervous System. Journal-Lancet 69:377-384 (Nov.) 1949).

They ascend without synapses in the sympathetic trunk. They then proceed by synapse with the postganglionic fibers in the first thoracic ganglion and inferior cervical ganglion (stellate ganglion). A few synapses occur with the middle cervical ganglion. The postganglionic fibers, the majority of which are in the stellate ganglion, join the roots of the brachial plexus.

In any dissertation on painful conditions involving the arms, we must also consider the sympathetic supply of the heart (figure 3), because of the anginal syndrome. The preganglionic fibers arise in the lateral horns of the spinal cord at the first to the fifth spinal segments. Some fibers—those arising from the first to the third thoracic segments—ascend to the cervical ganglia. The rest go to the corresponding paravertebral ganglia. These preganglionic fibers communicate by synapse with the postganglionic fibers in the three cervical ganglia and the upper five thoracic ganglia. The postganglionic fibers form the cardiac nerves and cardiac plexus. The superior cardiac nerve arises from the superior cervical ganglion, the middle cardiac nerve arises from the middle cervical ganglion, and the inferior cardiac nerve arises from the stellate ganglion. The other postganglionic fibers go directly to the cardiac plexus from the upper five paravertebral ganglia. Visceral afferent fibers travel over the sympathetic system along the middle and inferior cardiac nerves as well as in the cardiac plexus. However, the superior cardiac nerve does not seem to carry sensory fibers.

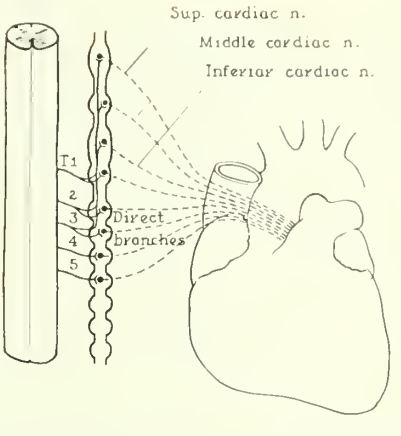

Fig. 3. Sympathetic nerve supply of the heart. Preganglionic fibers arise in the upper five thoracic segments. Postganglionic fibers arise in the superior, middle and inferior cervical ganglia, and upper five thoracic ganglia. Visceral afferent fibers from the heart travel over this system exclusive of the superior cardiac nerve (Reproduced from: MacCarty, C. S.: Surgery of the Sympathetic Nervous System. Journal-Lancet 69:377-384 (Nov.) 1949).

CLASSIFICATION AND TREATMENT OF PAINFUL CONDITIONS

A convenient method of analyzing painful conditions of the upper extremity is to divide them into two groups. The first group might consist of those conditions the painful stimuli of which travel along the *somatic* nervous system. The second group consequently would consist of those conditions in which the pain travels over the *sympathetic* nervous system. An example of the first condition would be, classically, a protruded cervical intervertebral disk. An example of the latter condition might be posttraumatic causalgia.

Somatic Syndromes. Woltman[7] has stated that the commonest cause of brachial neuritis is *trauma,* and that trauma was a factor in at least half of the 400 cases he reviewed. The brachial plexus and its terminal nerves may be either stretched or it may be injured by direct violence. Injuries caused by stretch usually are seen in children after birth trauma and in adult persons after accidents involving automobiles, machinery and the like, in which violent stretching and tearing of the upper extremity occur, frequently avulsing the roots of the brachial plexus. During modern warfare, penetrating wounds commonly

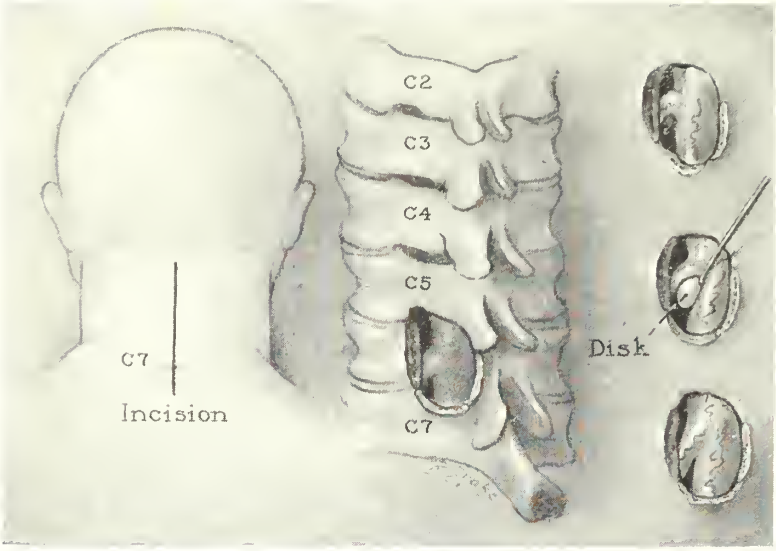

Fig. 4. Protruded intervertebral disk in the cervical part of the spinal column, showing how the cervical nerve root is compressed, and depicting the surgical technic for removal of the protruded disk.

are observed which injure the brachial plexus. Most injuries are immediately painful, and the pain may persist. True causalgia arising from an injury to the brachial plexus is rare, but, of course, may occur and in fact is relatively common when the terminal nerves of the plexus are involved.

The treatment of injury to the brachial plexus is a combination of surgery and physical rehabilitation. It is beyond the scope of this paper to go into details regarding the management of these injuries.[5,8] However, stretch injuries, in general, rarely can be benefited by surgery. On the other hand, penetrating injuries of the brachial plexus, if not too extensive, can be improved readily by adequate surgical repair.

Fractures and dislocations in the cervical portion of the spinal column obviously are causes of injury to the cervical roots in the form of compression and stretching of these roots as they leave the spinal cord and canal. The management of these injuries is directed toward reducing the pressure on the spinal cord and nerve roots.

In recent years, it has become increasingly apparent that the cervical nerve roots can be traumatized as they emerge from the cervical foramina by *hypertrophic arthritic* encroachment on the foramina or by *protruded cervical intervertebral disk* (figure 4). Some believe that basically, these two conditions are related. Both diseases are thought to be manifestations of degenerative disease of the spinal column.[9] Superimposed wear and tear on the lower cervical vertebrae, lower lumbar vertebrae and vertebrae in the lumbosacral area result in protrusion and extrusion of disk material into the foramina, causing root pain. Trauma frequently is a precipitating factor. Most protruded cervical intervertebral disks occur at the fifth or sixth cervical interspace.[10] This condition is classically manifested by pain in the neck and arm pain extending along the seventh or sixth cervical nerve root, frequently into the hand. There may be associated paresthesia and hypesthesia. Often it is noted that protruded intervertebral disks between the sixth and seventh cervical vertebrae compressing the seventh root produce a reduced or absent triceps reflex. Lesions situated one space higher may reduce or obliterate the biceps reflex. Correspondingly, there may be weakness in either the triceps or biceps muscle. Examination of the cerebrospinal fluid is commonly used to supplement the diagnosis of these lesions, and in many cases myelography is of value. Surgical decompression of the nerve root and removal of the protruded portion of the disk is the treatment when the condition is intractable.

There are pitfalls in the handling of brachial neuritis. One of the most tragic of these is to attempt to treat the condition conservatively, under the impression that the disease is inflammatory or has a basis in cervical arthritis, or even under the assumption that it is caused by a protruded intervertebral disk, when actually the lesion is an *intraspinal tumor.* It is well worth emphasizing that in these cases, the careful taking of a history, and performance of neurologic and roentgenologic examinations are indispensable, and that the examiner should continue to seek the cause of the root pain until he is satisfied as to its cause. Neurofibromas of the cer-

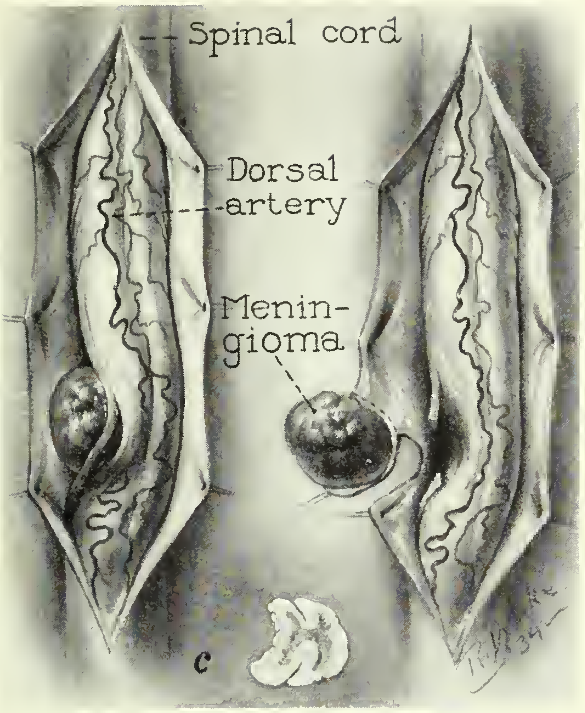

Fig. 5. Meningioma of the cervical portion of the spinal canal, showing the nerve root stretched over the tumor, producing excruciating pain in the arm.

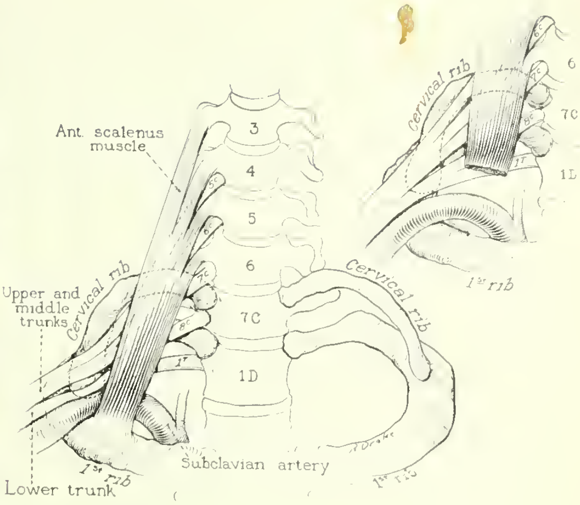

Fig. 6. Compression of the brachial plexus and subclavian artery between a cervical rib and a tight scalenus anticus muscle. The technic of surgical treatment is presented schematically (Reproduced, with permission of the publisher, from: Adson, A. W.: Cervical Rib. In: A Textbook of Surgery by American Authors, edited by Frederick Christopher. Ed. 4, Philadelphia, W. B. Saunders Company, 1946, pp. 410-413).

vical nerve roots and meningiomas (figure 5) compressing these roots are but two tumors which can produce pain that extends into the upper extremity. These usually can be successfully removal.

Pancoast's tumor[11] also is occasionally overlooked. This type of malignant lesion, arising in the apex of the lung, characteristically involves the lower roots or lower trunk of the plexus. The lesion of course is incurable, but cervical chordotomy or selective dorsal rhizotomy offers palliation in many instances.

The roots and trunks of the brachial plexus may be compressed between an *aberrant cervical rib* (figure 6) and a *tight scalenus anticus muscle* or by the scalenus anticus muscle (figure 7) alone, without a concomitant aberrant rib. The scalenus anticus muscle is closely related to all five spinal roots of the brachial plexus and to the subclavian artery. Corbin[4] has questioned whether the scalenus anterior muscle *per se* causes mechanical irritation of the plexus, but wrote that "it may do so reflexly, from tightening which is secondary to irritation of the plexus." He suggested that this irritation may be due to factors such as a herniated intervertebral disk. When the brachial plexus and subclavian artery are compressed by either or both of these structures, characteristic extension of pain occurs into the arm in the distribution of the roots involved as well as symptoms due to compression of the blood vessel. The author has seen an instance in which the subclavian artery had been thrombosed by such compression. Many instances of vasospastic phenomena have been reported—even cases in which classical Raynaud's phenomena were observed.

Adson described a simple test for diagnosis of this scalenus anticus muscle syndrome. The test is designed to tighten the muscle. It consists of

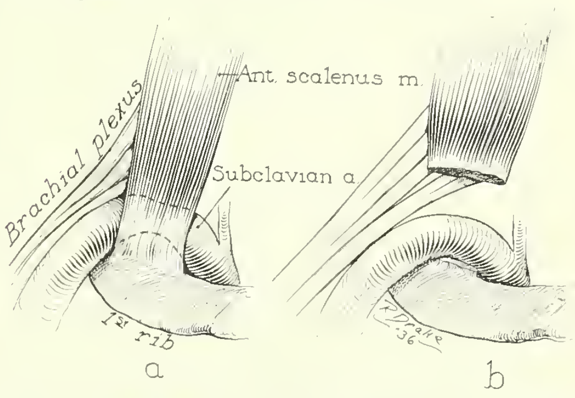

Fig. 7. Compression of the brachial plexus and the subclavian artery by a tight scalenus anticus muscle. Relief is obtained by surgical division of the muscle (Reproduced, with permission of the publisher, from Craig, W. McK. and Knepper, P. A.: Cervical Rib and the Scalenus Anticus Syndrome. Ann. Surg. 105:556-563 (Apr.) 1937).

turning the patient's head toward the side of the painful extremity, tilting his chin upward and asking him to take a deep breath. If the radial pulse is obliterated by this test, the surgeon is justified in dividing the scalenus anticus muscle and, if necessary, removing the offending rib. Adson felt that surgery in most instances is indicated only if the result of this maneuver is positive.

There are other unusual and rare syndromes which compress the nerves of the brachial plexus. Faulconer and Weddell[12] in 1943 reported intermittent compression of the subclavian artery and vein between the clavicle and the first thoracic rib. They referred to this condition as the *costoclavicular syndrome* (figure 8). They estimated that in about 62 per cent of persons, costoclavicular compression could be demonstrated by having the patient brace the shoulders backward and downward, thereby eliminating the radial pulse. They advised resection of the offending area of the first rib only when symptoms are caused by the syndrome and when this type of compression cannot be eliminated or avoided by simpler means. They cautioned against surgical interference solely on the basis of a positive result of the test.

In 1945, Wright[13] described a neurovascular syndrome produced by hyperabduction of the arms (figure 9). He called attention to the fact that among many people paresthesias develop in the upper extremities while the persons are sleeping with their arms over their heads or are working with their arms hyperabducted, as in

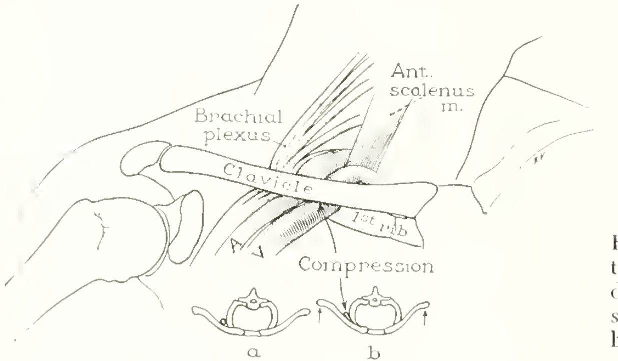

Fig. 8. The mechanism of the costoclavicular syndrome of Faulconer and Weddell is illustrated, depicting intermittent compression of the subclavian artery and vein between the clavicle and the first thoracic rib. This type of compression can be demonstrated by having the patient brace the shoulders backward and downward, an action which obliterates the radial pulse. In the insert, *a*, the subclavian artery and vein and the brachial plexus are seen in their normal positions between the first rib and the clavicle. In *b* is shown the effect of the backward and downward bracing maneuver (Reproduced, with permission of the publishers, from: Eaton, L. M.: Neurologic Causes of Pain in the Upper Extremities: With Particular Reference to Syndromes of Protruded Intervertebral Disk in the Cervical Region and Mechanical Compression of the Brachial Plexus. S. Clin. North America 26:810-833 (Aug.) 1946).

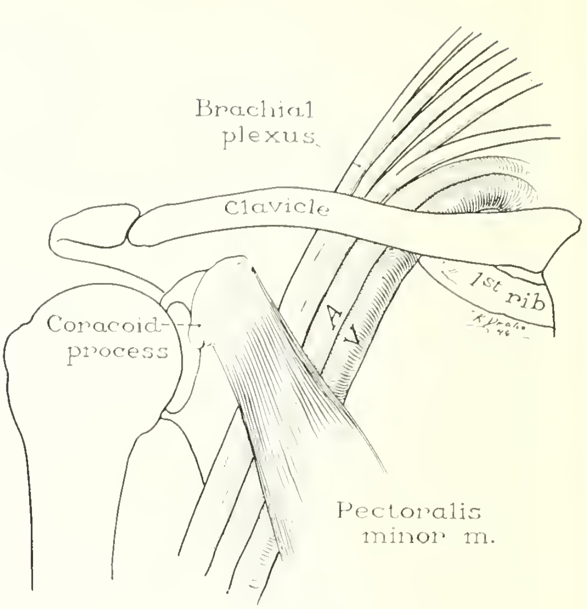

Fig. 9a.

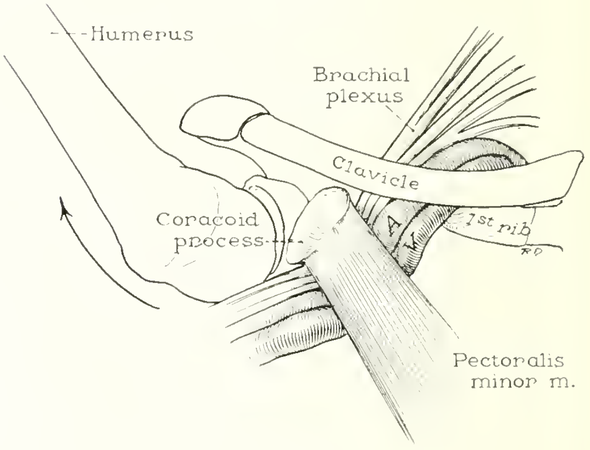

Fig. 9b.

Fig. 9. Demonstration, after photographs by Wright, of the neurovascular disturbance known as the "hyperabduction syndrome" or the "subcoracoid-pectoralis minor syndrome." In *a* the patient's arm is represented as being at the side, dependent. In *b* the arm is hyperabducted and abducted laterally to an elevated position. In this position the brachial plexus and the subclavian artery and vein are compressed between the pectoralis minor muscle and the coracoid process of the scapula (Reproduced, with permission of the publishers, from: Eaton, L. M.: Neurologic Causes of Pain in the Upper Extremities: With Particular Reference to Syndromes of Protruded Intervertebral Disk in the Cervical Region and Mechanical Compression of the Brachial Plexus. S. Clin. North America 26:810-833 (Aug.) 1946).

painting a ceiling. Among 150 normal persons, Wright found that the radial pulse could be obliterated on the right side in 125 and on the left side in 124, by hyperabduction. He concluded from studies on cadavers that in the pressure of this syndrome the subclavian artery, vein and brachial plexus are compressed beneath the coracoid process of the scapula and the pectoralis minor muscle. This is known as the *subcoracoid-pectoralis minor syndrome* or *hyperabduction syndrome*. Surgical relief is rarely necessary.

Wartenberg[14] described *brachialgia statica paresthetica* as usually not being accompanied by objective findings. There is a dysesthesia which occurs during recumbency, particularly in debilitated women. The cause probably is costoclavicular compression, and the treatment consists of exercises that will elevate the shoulders.

Inflammatory involvement of the nerves to the upper extremity may occur secondarily as a result of systemic disease, according to Woltman.[7] It often seems to result from "simultaneous acting and converging factors such as infection of the gallbladder, muscles, pelvic organs, teeth or tonsils, or thrombophlebitis, bronchiectasis, syphilis, alcohol and arsenic may be causative." In other cases, infection may extend directly to the brachial plexus from near-by infectious processes such as tuberculous lymph nodes or actinomycosis.

Many painful conditions result from orthopedic conditions of the neck and upper extremity. Young[15] has outlined the orthopedic lesions that may cause pain in the shoulder and arm. It is not the purpose of this paper to present this problem; rather, I shall mention only a few of the diseases which simulate "somatic brachial neuritis." Among these are arthritis of the shoulder joint, bursitis, synovitis and periarticular fibrositis or capsulitis.

Sympathetic Syndromes. There are painful syndromes of the upper extremity, the pain of which travels along the sympathetic nervous system. Steinbrocker, Spitzer and Friedman[16] have reviewed the problem of the shoulder-hand syndrome in reflex dystrophy of the upper extremity. They outlined the three stages of this symptom complex. The first stage lasts three to six months, and ordinarily consists of the appearance of a painful shoulder followed by swelling, pain and stiffness of the hand and finger. The complaints may arise first at either the hand or the shoulder, or both may be affected simultaneously. The shoulder may be diffusely tender and motion may be limited. The hand and fingers are swollen and the skin becomes smooth and taut. The hand becomes dusky pink or red. Later, the tissues may become cyanotic or pale. The finger joints become stiff. The grip is weak. The temperature of the skin is elevated and there may be excessive perspiration. Roentgenograms of the hand show little osteoporosis at this stage.

The second stage also may last three to six months. Relief of the painful shoulder and resolution of the swelling of the hand occur. The fingers become more stiff and deformed. The subcutaneous tissues and bones become atrophic. The cutaneous temperature of the hand decreases.

The third or last stage of this symptom complex may last for months and may progress to irreversible alterations in the hand and permanent limitation of shoulder mobility. The hand becomes smooth, glossy and drawn. The subcutaneous tissues become atrophic. The cutaneous temperature of the fingers is very low because of decreased blood flow. Limitation of motion in the hand and fingers is marked. There are flexor tendon contractures. The roentgenograms show osteoporosis of the entire extremity.

This puzzling syndrome actually is a manifestation of a number of diseases. It is seen complicating myocardial infarction or hemiplegia, the latter either following a cerebrovascular accident or being hemiplegia due to a brain tumor or trauma. The syndrome may occur after trauma to the brachial plexus, and in fact may be indistinguishable from what might be called "causalgia of the brachial plexus." It is seen after inflammatory lesions such as herpes or gonococcic arthritis. It may complicate cervical osteoarthritis or even a protruded cervical intervertebral disk. In some cases the etiology of the syndrome is not apparent. Steinbrocker and associates[16] reported cases in which the condition had been caused by panniculitis and diffuse vasculitis.

Any attempt to explain the mechanism of this syndrome is based on hypothesis, and cannot be discussed adequately in this communication.

Treatment of this syndrome is directed toward interruption of the sympathetic pathways, either by repeated injection of the appropriate sympathetic ganglia with an anesthetic agent or by surgical interruption of the sympathetic chain by removing the stellate ganglion and the upper two or three thoracic ganglia. It should be emphasized that sympathetic blocks are used when the condition is mild or when surgical treatment would be too risky. When the condition is intractable and the patient is considered a satisfactory surgical risk, sympathectomy probably should be done.

It becomes increasingly apparent to the reader of this paper that causalgia and angina, as well as other types of reflex sympathetic dystrophy, are closely related or may even be a part of the shoulder-hand syndrome. Causalgia was first described by Mitchell and associates.[17] It occurs as a complication of injury to peripheral nerves. It is, of course, observed most frequently during wars. An excellent résumé of this syndrome as it was seen during World War II was published by Kirklin, Chenoweth and Murphy.[18] The syndrome is characterized by a lesion adjacent to or involving major nerves and blood vessels. There is an excruciating constant throbbing pain in the entire limb. The skin of the hand is reddish cyanotic, but this change may affect only the area of the hand innervated by the traumatized nerve. There is excessive perspiration. Usually, extensive trophic changes in the skin occur, and the cutaneous temperature may vary considerably. The slightest stimulation or emotional upset may produce paroxysms of exquisite pain. In a typical instance of the disease, the diagnosis is obvious and sympathetic disruption is indicated. When this procedure is to be performed in the upper extremity, it consists of cervicodorsal sympathectomy. Homans[19] described a syndrome of less dramatic appearance which he called "minor causalgia." When this condition is present, procaine hydrochloride may be injected into the suspected sympathetic pathway for diagnostic purposes; if relief is obtained thereby, surgical intervention can be instituted.

The reference of pain into the upper extremity as a complication of heart disease should be mentioned. The anginal syndrome is a manifestation of sympathetic reflex pain. On an anatomic basis (figure 3), relief might be obtained, as suggested by White,[20] by performance of rhizotomy of the upper five thoracic dorsal roots or by removal of the stellate ganglion and upper five thoracic sympathetic ganglia (figure 10). Unfortunately, many of the patients will not withstand such surgical procedures. The injection of alcohol into the stellate ganglion, in our experience, has resulted in limited success.

The complex problem of postamputation discomfort associated with "phantom limb," and burning pain, has been approached in numerous ways. Neuromas have been removed, rhizotomy and chordotomy have been performed, and resection of the cerebral cortex has been done, all with varying degrees of success.

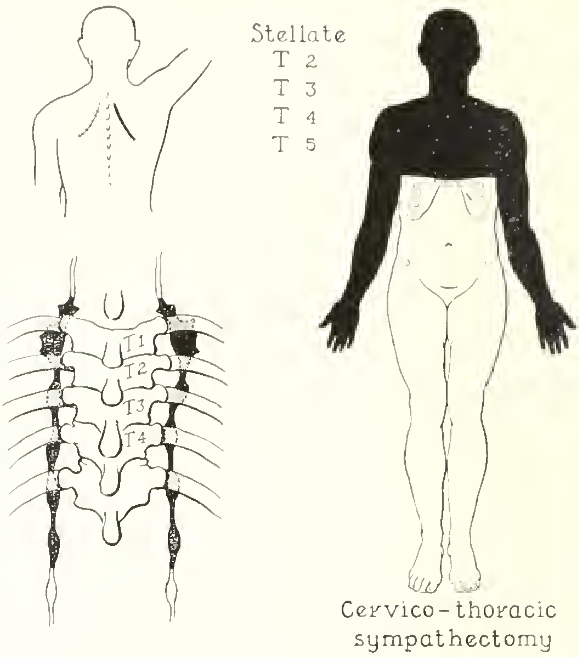

Fig. 10. A method of sympathectomy designed to eliminate the sympathetic nerve supply to the heart. The dark area outlines that portion of the body which does not perspire after performance of sympathectomy (Reproduced from: MacCarty, C. S.: Surgery of the Sympathetic Nervous System. Journal-Lancet 69:377-384 (Nov.) 1949).

In our experience, the burning causalgic aspect of this type of pain or distress can be alleviated in most cases by sympathectomy. The problem is never completely solved, however, by this sort of surgical intervention.

SUMMARY

The neurologic causes of pain in the upper extremity have been presented. The somatic and sympathetic nerve supply of the upper extremity is reviewed briefly. A classification of the conditions based on these anatomic nervous systems has been suggested. Those painful conditions which involve primarily the somatic nerves have been reviewed briefly and the surgical treatment of them has been presented. Painful conditions which involve the sympathetic nervous system have been discussed in some detail, and the surgical relief of these phenomena has been considered.

CONCLUSION

It must be concluded that most causes of pain in the upper extremity can be identified by recourse to modern knowledge and technic. It is also gratifying to report that most of the painful conditions in question can be alleviated by appropriate surgical or medical therapy.

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Hexamethonium for Blood Flow to Foot

Peripheral blood flow is greatly increased by intravenous doses of hexamethonium, a compound related to tetraethylammonium but twice as potent. The sympathetic vasoconstrictor outflow is partly or completely interrupted at the ganglia. Effects comparable to those of extradural Metycaine or intrathecal procaine lumbar blockade were noted in healthy volunteers by Harold W. Schnaper and associates at Georgetown University, Washington, D. C.

Blood flow was measured in the left foot by a modification of the venous occlusion plethysmograph described by Abramson. Digital pulse volume and blood flow were determined in the first toe of the right foot with a Burch-Winsor portable plethysmograph.

Average minute rate of circulation rose from 1 to 9.8 cc. per 100 cc. of foot volume with C6 and to 10.2 cc. with epidural blockade. The highest value after intravenous injection was noted in 15 minutes, whereas Metycaine required 25 minutes to an hour.

Skin temperature of the toes was 15° to 24° F. higher after either procedure, although changes in temperature and pulse volume did not correspond with circulation. Either C6 or regional anesthesia prevented the vasoconstrictor reaction to a deep breath, ice applied to the forehead, and other stimuli.

C6 was given therapeutically in doses of 50 to 100 mg., the latter for complete sympathetic inhibition. To avoid dangerous hypotension, cardiac and other susceptible patients received trial doses of 5 to 10 mg.

Harold W. Schnaper, Robert L. Johnson, Edward B. Tuohy and Edward D. Freis: The effect of Hexamethonium as compared to procaine or Metycaine lumbar block on the blood flow to the foot of normal subjects. J. Clin. Invest. 30:786-791, 1951.

Histaminic Cephalgia

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HISTAMINIC CEPHALGIA is a distinct clinical entity which recently has been recognized and described.[1-3] It is a unilateral headache, and occurs chiefly in males. The average age of the patients is more than 40 years. Of 3,072 patients with headache observed by me during the past five years, 14.5 per cent had histaminic cephalgia. This is obviously not a true index of the frequency of this syndrome encountered in general practice. Pain is the outstanding symptom. So severe and frequent are the attacks of pain that practically every patient had contemplated suicide. Patients have termed it "suicide headache." While several of them have thought of suicide, I have never known one who has carried out his threat, probably because of the short duration of the attack and the fact that he feels entirely normal between attacks.

The pain is usually sudden and severe in onset, but is of short duration, lasting usually less than an hour and often subsiding abruptly. It is unilateral and involves the region of the orbit and the temple, but may extend to the upper jaw, occasionally the lower jaw, and even into the occipital area, the neck and shoulder. It does not follow the anatomic distribution of any cranial nerve. Lacrimation and frequently profuse watering of the eye occur, and usually are associated with redness and slight edema, as well as rhinorrhea or plugging of the nostril and dilatation of the vessels in the painful area (figure 1). Beads of perspiration often are visible on the forehead above the involved eye. After an attack, marked residual tenderness is frequently present in the pain area and may persist for minutes or even for a few hours. There are no trigger zones, and nausea and vomiting are not associated phenomena. Attacks occur once or several times within twenty-four hours but are more frequent during sleep. The attacks tend to occur in a series and may occur repeatedly (figure 2), very often on a seasonal basis. Remissions and exacerbations occur spontaneously. Horner's syndrome is not uncommon in this type of case.

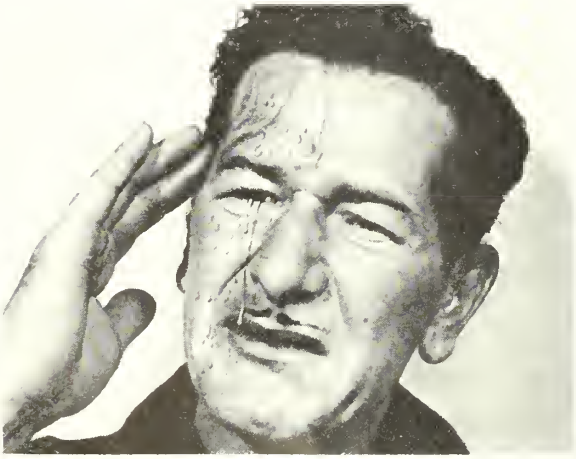

Fig. 1. Appearance of patient in the course of an induced attack of histaminic cephalgia on the right side. This is a composite picture made from a technicolor motion picture. Lacrimation of the right eye is visible, tears are flowing down the right cheek, and the vessels in the right frontal area are evident. Pain was confined to the right side of the head.

In order to contemplate the problem created by headache, one must have a starting point. A carefully recorded history will usually furnish more clues to the underlying cause of the pain than will all other diagnostic procedures combined.[4,5] One must attempt to gain an understanding of the patient's headache from his description of the frequency, intensity and character of the pain. The time of onset is of utmost significance. The occurrence of nocturnal attacks frequently provides the clue to the classification of the headache. Does it awaken the patient from sleep? Is the pain so severe that the patient is up and pacing the floor before he is fully awake? Such characteristics help to classify typical histaminic cephalgia. Associated manifestations are an important means of classification, and aid one in making a differential diagnosis. While interviewing a man, aged 66, who had been having recurring bouts of head pain at frequent intervals over a period of 35 years, I asked him to describe his experiences of the previous night, and he replied:

> "Ten p.m. found me tired and sleepy, and immediately I was in deep slumber. At precisely 11:30 p.m., unawake, I was experiencing the sensation of having an abscessed tooth extracted without an anesthetic. Awake, the sensation changed to a crushing, profound pressure, beginning under the right cheek bone and extending through the eye to the right temple. The tor-

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ture was so agonizing that no adequate, precise description is afforded by the English language. To remain in bed was impossible. I began to move about, twisting my body into the most grotesque postures in an attempt to alleviate the agony, but unavailingly. Fifteen minutes of this pain was followed by more piercing pains. A red-hot pointless poker was being driven from my cheek bone through the eyeball and into the temple.

"In the next fifteen minutes water ran out of the eye, from the nose and a thick mucus formed in the mouth. Then at times a sharp pain passed through the ear and the artery on the right side of the head asserted itself

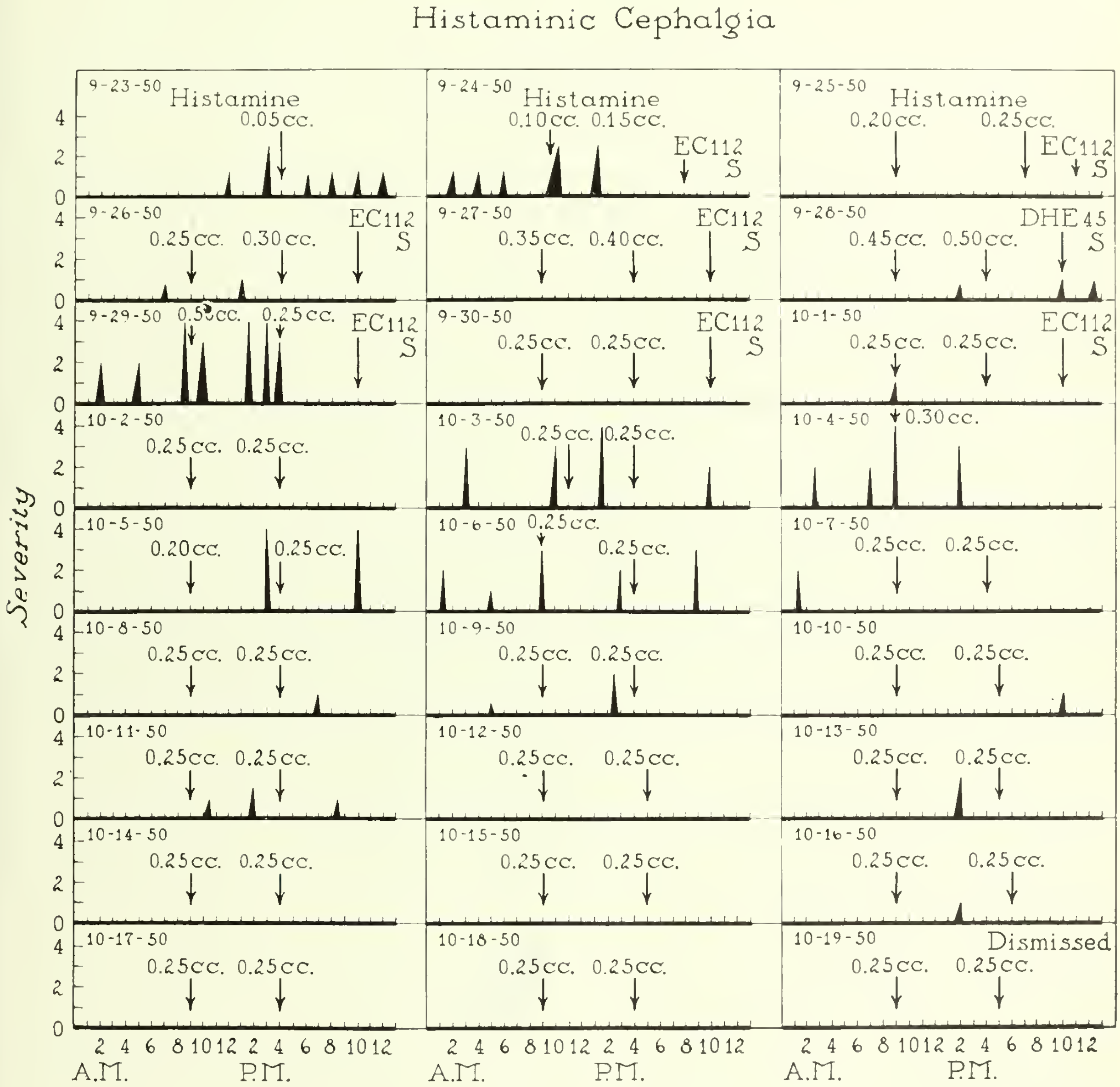

Fig. 2. Graphic record illustrating frequency, severity and duration of attacks of histaminic cephalgia in a man, aged 62 years. The present series of attacks began September 9, 1950. The EC-112* suppositories which were used at bedtime prevented nocturnal attacks. Each suppository contained 2 mg. of ergotamine tartrate plus 100 mg. of caffeine. The DHE 45 suppository which contained 4 mg. of dihydroergotamine did not prevent the nocturnal attacks. The patient was free from attacks at the time of his dismissal, and has not had a recurrence during the past year. This patient had previously been under observation from August 24, 1943 through September 9, 1943, and had a similar series of attacks. He responded to histamine desensitization at that time and remained free from attacks for a period of approximately seven years without any treatment during this interval. It will be noted that a grade 3 attack was precipitated by 0.5 cc. of histamine on September 29, 1950. Thereafter, the dose was reduced to 0.25 cc., and no attempt was made to increase it.

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*Supplied by Sandoz Pharmaceuticals, New York City.

> in a wild pounding. Almost in collapse, while a cold sweat ran in rivers, I prayed for unconsciousness. This agony continued for almost an hour. To speak in one of these seizures was impossible. It is the most awful misery devised for man.
>
> "A cold shiver ran up my spine. Then in an instant, the pain ceased, and the attack was over. Exhausted, I fell into bed and asleep. There were nights when, exactly one and a half hours after sleep overtook me, these indescribable episodes followed twice more, exactly one hour and thirty minutes apart. Rarely they came in the daytime, but invariably when I was in repose."

The experienced clinician should recognize the patient's story as that of histaminic cephalgia. A typical attack was provoked in this patient by the subcutaneous administration of 0.35 mg. of histamine base. The attack developed fifty minutes after the injection. The attack was aborted in a period of fifteen minutes by the intravenous administration of 1 cc. of a 1:100,000 solution of epinephrine plus 4 cc. of whole cortical extract. It is notorious for attacks of histaminic cephalgia to occur during sleep, and the mere fact that the patient gets out of bed promptly and paces the floor serves to distinguish it from tension headache which may also awaken a patient at night, but does not make him get out of bed.

All of the patients with histaminic cephalgia who have come under my observation at the Mayo Clinic have been incapacitated by their illness and they had not obtained any relief with the usual methods of treatment. Many patients had undergone intranasal operations; cauterization of the sphenopalatine ganglion; injection of medicinal agents into one or more divisions of the fifth cranial nerve; extractions of teeth; ligation of the temporal, middle meningeal and even the external carotid arteries, as well as cervical sympathectomy without obtaining relief.

Approximately 40 per cent of patients had undergone unnecessary operations in a vain attempt to obtain relief of their pain. Table I includes a list of the various operative procedures employed in the case in which a man, aged 44 years, had right histaminic cephalgia. When he was referred to the clinic for cervical sympathectomy in November 1950, he was having two or three attacks every twenty-four hours. The intramuscular injection of 100 mg. of cortisone daily for five days without any additional treatment caused a 30 per cent reduction in the frequency and severity of his attacks. An additional 500 mg. of cortisone was administered in a like manner, but did not serve to eradicate his attacks. Histamine desensitization was then started and continued for a month, and at the time of his dismissal he had only had one mild attack in a period of four days. Additional follow-up information was not available when this paper was written.

TABLE I.

SURGICAL PROCEDURES WHICH HAD BEEN PERFORMED IN A CASE OF RIGHT HISTAMINIC CEPHALGIA

1941.— Extraction of right first and second bicuspids.

1941 to 1949.— Treatment for "sinus trouble."

1946 (February).— Opening of the right maxillary sinus.

1949 (February).— Extraction of all remaining teeth.

1949 (September).— Right maxillary area explored for possible osteomyelitis; negative findings.

1949 (October).— Ligation of right external carotid artery.

1949 (November).— Ligation of right temporal artery; negative arteriographic findings; injection of drug(?) into the right trifacial nerve and second and third cervical nerves.

1949 (December).— Ligation of right occipital artery; ligation of right middle meningeal artery, and injection of alcohol into right trifacial nerve.

1950 (July).— Section of right second and third cervical nerves.

1950 (October and November).— Innumerable blocks of right stellate ganglion with procaine hydrochloride, resulting in complete relief for three to twenty-four hours.

EXAMINATION OF THE PATIENT

Adequate treatment cannot be instituted until the type of headache has been determined. A complete physical examination and routine laboratory tests should be performed. The eyes, ears, nose, throat and nervous system should be examined carefully. Roentgenographic examination of the head should be employed routinely in all cases of headache. Special diagnostic tests also may be indicated in cases in which the presence of certain organic lesions is suspected.

PROVOCATIVE TESTS

Failure of treatment and an error in diagnosis are due to the fact that the physician has not had an opportunity to see the patient in the course of a spontaneous or induced attack of pain in the head. The reproduction of the attack and its subsequent abortion are of great value, although not always possible. It is of both medical and psychologic significance. The patient should not be aware of the fact that the physician is attempting to reproduce the attack, but he gains far more confidence in the physician when he is able to stop the attack at will—thus giving both himself and the patient a common understanding of the headache. It relieves the fear and tension of the patient when the pain is so incapacitating and previous attempts at relief have been unsuccessful.[5]

In cases of histaminic cephalgia, the subcutaneous administration of 0.35 mg. of histamine base often will precipitate an attack identical with the one the patient has attempted to describe (figures 1 and 3). This is especially true if he is experiencing more than one attack each twenty-four hours. "Histamine headache" and "histaminic cephalgia" should not be regarded as synonymous terms. The immediate reaction following the administration of the histamine as a provocative test is a generalized "histamine headache," which is a physiologic response, lasting about five to ten minutes. This occurs even in normal persons as well as in those who have histaminic cephalgia. Thereafter, for a period of five to thirty minutes and sometimes even longer after the physiologic effects of the drug have worn off, the patient feels entirely normal. One naturally wonders what is happening during the latent period. Therein may lie the secret to the mechanism of the syndrome. However, in cases of histaminic cephalgia, reproduction of the typical attack will occur about fifteen to fifty minutes following the cessation of the "histamine headache," and is a pathologic response. It occurs only in cases of histaminic cephalgia. The pain of "histamine headache" is chiefly intracranial in origin, owing to dilatation of the large vessels at the base of the brain, whereas the pain of histaminic cephalgia results chiefly from dilatation of extracranial vessels.

The sublingual administration of 1/50 grain (0.0013 gm.) of glyceryl trinitrate also will frequently precipitate an attack of histaminic cephalgia in a patient with this illness, but in my experience it is not as satisfactory a provocative agent as histamine. I have never reproduced an attack of histaminic cephalgia with nicotinic acid.

Histaminic cephalgia represents a localized anaphylactoid reaction with both localized and systemic manifestations. Patients with histaminic cephalgia are hypersensitive to histamine. During spontaneous and induced attacks it seems evident that histamine is released from sensitized cells in the pain area and accounts for most of the local phenomena. During a given attack, the acidity of the gastric contents frequently increases to an abnormally high level indicating absorption of the agent into the blood stream. This increase in acidity is comparable to that which is induced by the subcutaneous injection of known amounts of histamine. I have previously called attention to the relationship between acute peptic ulcer and histaminic cephalgia[6,7] but I have not observed this relationship in cases of migraine.[8] Other biologic agents such as acetylcholine may be liberated in the pain area. The release of acetylcholine could theoretically account for the secretory phenomena of the lacrimal glands and the mucous membranes of the nasal cavity. The full explanation must await additional experimental study.

The induced attack can be aborted promptly

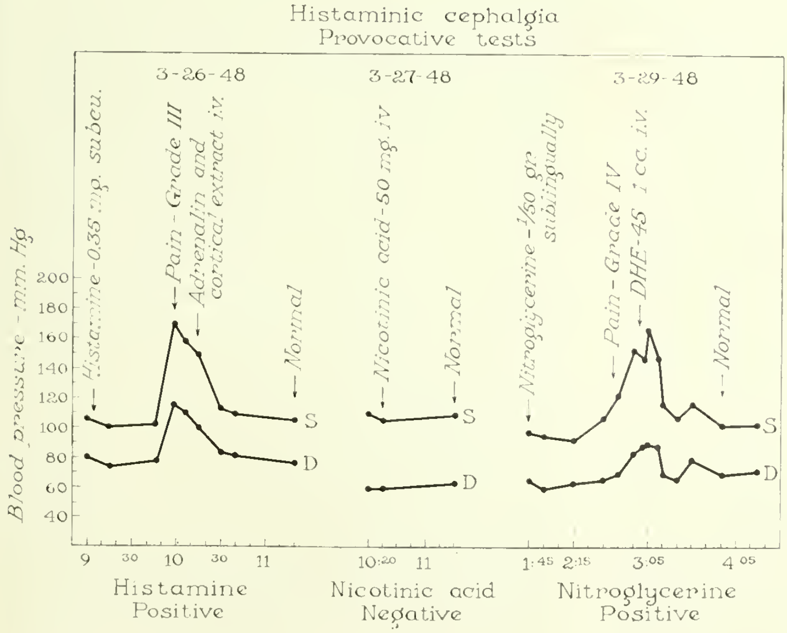

Fig. 3. Graphs illustrating positive results of provocative tests with the use of histamine and glyceryl trinitrate. A negative result was obtained with nicotinic acid. The patient was a man, aged 55 years. The attack developed approximately 55 minutes after the administration of the provocative agent. One cubic centimeter of a 1:100,000 solution of epinephrine plus 4 cc. of whole cortical extract was administered intravenously to abort the attack induced with histamine. One cubic centimeter of DHE 45 was administered intravenously to abort the attack provoked with glyceryl trinitrate. Approximately the same rise in blood pressure was noted in each attack when the pain was maximal. This patient evidently had mild hypertension. In most cases, a rise in blood pressure has not been observed during an induced attack.

by the intravenous administration of 1 cc. of dihydroergotamine (DHE 45), which is dihydroergotamine methanesulfonate. The intravenous administration of 1:500,000 solution of epinephrine can also be used to abort induced attacks, but the equipment generally used for the administration of this drug is more cumbersome than that used for the administration of dihydroergotamine. Epinephrine constricts the extracranial vessels but it does not constrict the intracranial vessels. Thus the fact that one can abort an attack of histaminic cephalgia with epinephrine indicates that the pain is extracranial in origin. Dihydroergotamine, however, constricts both the intracranial and extracranial vessels.

I have succeeded in producing attacks of histaminic cephalgia in approximately 69 per cent of cases in which patients with this disease have come under my observation. It is interesting to note that approximately 45 per cent of the patients previously had noted that their attacks had been precipitated by the use of alcohol. I occasionally have observed that acute attacks of histaminic cephalgia have been precipitated by the intravenous administration of ACTH. This has occurred only in cases of this syndrome. The ACTH was administered in the following manner. Twenty-five milligrams of ACTH was added to 500 cc. of a 5 per cent solution of dextrose, and the resulting solution was administered intravenously at the rate of 20 drops per minute for periods ranging from two to eight hours. The induced attack usually has been observed after the ACTH has been administered for forty to sixty minutes.

DIFFERENTIAL DIAGNOSIS

Histaminic cephalgia need not be confused with classic migraine. There is no hereditary background for the attacks of histaminic cephalgia. The frequency, severity and short duration of attacks (usually measured in minutes); their sudden onset and sudden cessation; the subsequent remissions and exacerbations; the absence of cortical phenomena such as scotoma; the characteristic nocturnal attacks, as well as the profuse watering and congestion of the eye, rhinorrhea or stuffiness of the nostril on the involved side serve to distinguish histaminic cephalgia from migraine.

The pain of both migraine and histaminic cephalgia is vascular in origin. In migraine there are three phases of the condition to consider, whereas in histaminic cephalgia there are only two phases to consider.

In migraine, the first phase is the vasoconstricting phase. Pain is not a factor in this phase because vasoconstriction *per se* does not give rise to pain. It does account for scotomata and cortical manifestations. This phase does not occur in histaminic cephalgia.

The second phase is the vasodilating phase. The vasodilatation is the immediate cause of the pain. This phase is common to both syndromes. It develops more promptly in histaminic cephalgia than in migraine.

The third phase is the edematous phase. This naturally follows if the vasodilatation persists for any length of time. Like the second phase, it is associated with pain and is common to both syndromes. It is of short duration in cases of histaminic cephalgia, but may persist for hours in cases of migraine.

The character of the pain, the absence of trigger zones, and the fact that the pain does not follow the anatomic distribution of the fifth cranial nerve or any cranial nerve distinguish histaminic cephalgia from trigeminal neuralgia. The distribution of the pain of atypical facial neuralgia or atypical facial pain does not correspond to the anatomic distribution of any cranial nerve. The term "atypical facial neuralgia" has been used to describe a peculiar deep-seated, aching pain that is not constant, not paroxysmal or intermittent, but characterized by attacks of greater or less severity occurring at intervals.[3] Remissions are rare. Atypical facial pain often appears to have a psychogenic basis. The pain is less severe than trifacial neuralgia and is likely to be more constant. It may begin at any age, whereas trifacial neuralgia and histaminic cephalgia tend to develop later in life.

Unilateral recurrent erosion of the cornea,[4] which occurs at night or on opening the involved eye in the early morning, may be mistaken for histaminic cephalgia. Pain, however, is confined to the orbit in cases of recurrent ulcer of the cornea but not in cases of histaminic cephalgia. Blepharospasm and photophobia occur with recurrent erosion of the cornea but not with histaminic cephalgia. Furthermore, an examination of the cornea with the slit lamp will reveal erosion if the patient is examined in the course of an attack. Such erosions often heal promptly, and if the patient is examined a few hours later there may be no evidence of such a lesion.

Attacks of tension headache often occur at night, but the pain rarely, if ever, forces the patient to get out of bed. Such headache usually is the expression of an anxiety tension state—an overwrought nervous system. The history alone usually will serve to distinguish this type of

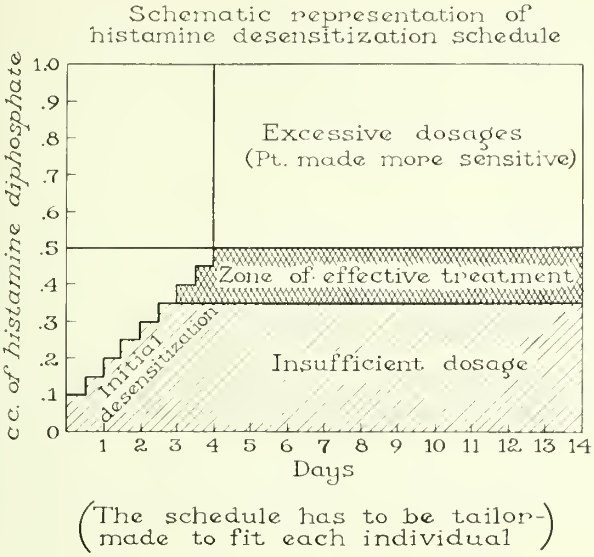

Fig. 4. Schematic representation of histamine desensitization schedule.

headache from histaminic cephalgia. In cases of tension headache the pain tends to be generalized but usually is most intense in the occipital region. At first it is usually recurrent in nature, but eventually tends to become continuous.

Tension headache is not caused by nervous tension, *per se*, which gives rise to a state of hypertonicity; but by the hypotonicity (vasodilatation) which follows the hypertonicity (vasoconstriction).

TREATMENT

The objective of treatment should be twofold: (1) to alleviate the pain of the acute attack, and (2) to prevent subsequent attacks. The intravenous administration of 1 cc. of dihydroergotamine (DHE 45) frequently will abort an acute attack in one to five minutes, if it is administered at the onset of the attack. In a few cases, the breathing of 100 per cent oxygen will alleviate an attack to a marked extent, especially if the attack is mild and if the patient resorts to the use of oxygen promptly. If the attack has fully developed and has persisted for several minutes, it is likely to run its course irrespective of the drug employed. A rectal suppository which contains 2 mg. of ergotamine tartrate and 100 mg. of caffeine, if used at bedtime, frequently will prevent nocturnal attacks (figure 2). This is more effective in preventing nocturnal attacks than is the oral administration of ergotamine tartrate and caffeine. Histamine "desensitization," however, is the treatment of choice for preventing future attacks.

My procedure for the subcutaneous administration of histamine to produce histamine desensitization (figure 4) is as follows:[2,7]

I use the contents of 1 cc. ampule of 0.275 mg. of histamine diphosphate per cubic centimeter, which contains 0.1 mg. of histamine base. Of this ampule, I use 0.05 cc. for the first dose, which is administered subcutaneously. Two injections are administered daily about six to eight hours apart. Each injection is increased by 0.05 cc. until 0.50 cc. is given. In some instances, this amount is not adequate and it is necessary to continue to increase the amount until 0.75 cc. or even 1 cc. is reached. Adequate dosage is determined by the patient's response. If no immediate flushing of the face or throbbing is experienced with the injection and if the patient's symptoms decrease in severity or frequency, the procedure is adequate. However, if the symptoms are aggravated or seem to be precipitated by the injections, the patient may be undergoing "sensitization" rather than "desensitization." In such a case, the subsequent dose is reduced by a half (fig. 2; 9-29-'50), and again the amount administered at each injection is increased by increments of 0.05 cc. to a level just below that amount which precipitated the symptoms. This amount is then injected twice daily as the maintenance dose. The patient is instructed in the technic of administering the injections himself (whether the dose is 0.25 cc. or 0.75 cc.) and is told to continue them twice daily at home for two or three weeks and once daily thereafter for an indefinite time. Some patients find it necessary to continue to use one or even two or three injections daily at home in order to remain free of symptoms. There is no harm in continuing with maintenance doses of histamine for a lifetime if necessary. I am convinced that the use of smaller amounts of histamine at more frequent intervals controls symptoms more satisfactorily than large amounts administered subcutaneously only once daily or every other day.

After a long period of freedom from symptoms, many patients are lulled into a false sense of security, and discontinue the injections of maintenance doses. Many others report a recurrence of symptoms coincidental with an infection of the upper part of the respiratory tract. The maintenance dose then is inadequate, and resuming the desensitization schedule is often difficult because of the change in the patient's sensitivity. When experiencing a recurrence of headaches, many patients with histaminic cephalgia report attempting to resume the desensitization schedule and increasing the dose to the former maintenance level without realizing that, with a recurrence of the attacks, the sensitivity to histamine is greater than it was during the previous episode. The reason for this has not been determined. Only careful reports and observations of the patient's symptoms and response to injections in each twenty-four hours will give a clue to the schedule most satisfactory for each patient; hence, my expression that each schedule has to be "tailor-made" to fit the individual patient.

It is usually easy to treat a patient with histaminic cephalgia when he is observed for the first time, provided he has not previously had histamine therapy. About 95 per cent of the patients will respond to histamine desensitization, and irrespective of the severity, frequency and duration of the attacks, they will cease within ten to twenty days. However, if the patient has previously had histamine therapy, and especially if the dose has been above his reaction level, and one attempts to repeat the procedure, the problem becomes increasingly difficult. In attempting to treat succeeding series of attacks, the dose employed becomes less and less. If one, for example, attempts to use the same dose while treating the third series of attacks as was previously employed in the first, the patient may be made worse instead of better. Irrespective of whether patients have been treated previously, approximately 92 per cent have responded to treatment. Approximately 36 per cent of patients have a recurrence of symptoms within the first year.

During the past decade when it has been necessary to readjust the patient's schedule, it has frequently been necessary to administer whole cortical extract before resuming injections of histamine (0.05 cc.). I have usually administered 3 cc., 4 cc. and 5 cc. respectively, at hourly intervals until a total of 40 to 50 cc. of the whole cortical extract has been administered. For some strange reason, the whole cortical extract seems to reduce the patient's sensitivity to histamine, or at least "reconditions" him so that he will again respond in a satisfactory manner. Recently, I have substituted cortisone for the whole cortical extract. In my early experience, I administered 100 mg. of cortisone intramuscularly daily for three or four days, or longer before resuming the subcutaneous injections of histamine. The use of cortisone alone in the treatment of histaminic cephalgia has been disappointing to date. In a careful study of 21 patients who were having frequent and severe attacks of histaminic cephalgia, only four obtained relief of symptoms with cortisone therapy (usually 100 mg. daily). The remaining 17 patients did respond to histamine desensitization after they received cortisone. I have had essentially the same experience with the use of ACTH. The results of these observations will be reported later.

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Thoracentesis.—After treating fifteen cases of pleuritic effusion by tapping, Dr. Quincke, of Berlin, has arrived at the following conclusion:—In order to get rid of serous exudations, the most practicable method appears to be puncture with a fine trocar, and withdrawal of the liquid by suction. Even when nothing more than a palliative result is to be expected, puncture is often indicated. In exudations of pus, incision and daily out-cleansing of the cavity of the pleura is indicated; this should be done early, since a spontaneous absorption is unlikely to take place, and is at best very tedious.—Berliner Klin. Woch.

Northwestern Medical & Surgical Journal (THE JOURNAL-LANCET) 3:185, 1872

Monographs on Pain

THOMAS E. KEYS[*]

Rochester, Minnesota

I am pleased to prepare at Dr. Lundy's request a short check list of books on pain. This is not meant to be inclusive but is merely a compilation of volumes that are readily available. For historical items the reader is referred to more than 100 titles listed under "Pain" in the first three series of the *Index Catalogue of the Surgeon General's Office* (Army Medical Library). The present listing has avoided popular accounts and has stressed monographs with biological implications.

The history of anesthesia is the story of the conquest of pain incident to surgical procedures. By and large, modern anesthesiology, especially in the United States, has achieved success in this respect. It has done so without being able to account for the origin of pain or for scarcely any of its implications.

It is refreshing, then, that anesthesiologists, physiologists, internists, surgeons, and others are becoming more and more concerned with pain and are devoting so much of their time to the study of this important and fundamental medical problem.

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(Continued on page 123)

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Digests from Current Literature On Pain

PHANTOM LIMB PAIN ASSOCIATED WITH SPINAL ANALGESIA. Report of a Case. P. TOKER, *South African M. J.* 25:587-588 (Aug. 18) 1951.

"The uncommon complication of an acute exacerbation of pain in a 'phantom limb,' during spinal analgesia, is of sufficient interest to warrant report.

"A European male, aged 60 years, was admitted to hospital on 8 March 1951 suffering from Buerger's disease. In December 1949 the patient had had a right mid-thigh amputation. Pain in the phantom limb appeared shortly after the amputation, and has been present intermittently ever since, but was never of great severity. He was readmitted because of the onset of symptoms in his left leg. A lumbar sympathectomy was decided upon to alleviate the condition, and on 14 March the patient was prepared for operation. 'Spinal analgesia was induced with 1.5 ml. of 1:200 Nupercaine, the patient being in the left lateral position, with the table in a slight Trendelenburg tilt. No difficulty was experienced in giving the spinal injection. The patient was maintained in this position for five minutes before being turned on to his back. Shortly after the spinal injection, and while still on his side, the patient complained of pain in the phantom foot similar to that previously experienced. As analgesia was satisfactory the operation commenced and proceeded uneventfully. The pain in the phantom foot, however, increased steadily and about half-way through the procedure the patient complained that it was now unbearable; 50 mg. Pethidine was administered intravenously. The pain subsided after the injection of Pethidine, but did not disappear completely.

"When seen in the Ward some hours later, the patient volunteered the statement that 'the pain in the right foot (phantom limb) had disappeared when life returned to the left leg.'

"Brooke Moore reports the case of a man who suffered an acute exacerbation of pain in an amputation stump—throughout the entire duration of spinal analgesia, administered for a herniotomy. Gwendolen Harrison reports two cases—one of severe pain in a phantom foot, and the other of aggravation of pain in a patient suffering from sciatica, both during spinal analgesia. If one accepts the hypothesis of a central focus of pain production in these cases, no alteration or relief of pain in a phantom limb is to be expected. It is, however, difficult to understand why an acute exacerbation of pain should take place during the course of spinal analgesia. An interesting feature of the case described, is that in the five weeks that have elapsed since the operation, the patient has been free of pain in the phantom limb. This is the longest intermission of pain the patient has experienced. Apart from the great interest attached to this phenomenon, there is also a practical aspect. Where a general anæsthetic is dreaded by the patient, and a spinal injection is decided upon, it is a wise precaution to warn the patient, who has a phantom limb, that some form of covering anæsthesia may be required."

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PROCAINE FOR PAIN. LYON STEINE, M.D., *G. P.* 3-53-57, 1951.

Injection of procaine solutions in the office or home may relieve pain in the shoulder, chest, or back, sprained ankle, sciatica, and pruritus ani. Lyon Steine, M.D., of Valley Stream, New York, also uses procaine for anal surgery and reduction of fractures and dislocations.

From 0.5 to 1 cc. of 2 per cent solution mixed with injected materials prevents the hypodermic sting, especially in immunizing infants or children. The drug can be mixed with pertussis-diphtheria-tetanus vaccine, liver extract, vitamin concentrates, or mercurial diuretics. A superficial abscess or carbuncle is infiltrated with 5 cc. of 1 per cent procaine containing 50,000 to 100,000 units of crystalline penicillin.

Low back pain radiating to the groin or leg is often associated with deep tenderness where the lateral edge of the lumbar muscle meets the ilium near the posterior spine. A long-lasting aqueous solution, Eucupin-procaine, may be injected in 3 cc. doses into one or two trigger points, or if preferred, Eucupin or Nupercaine in oil.

For simple *sprained ankle or wrist*, 10 to 20 cc. of 1 per cent procaine is instilled into tender areas, and the limb is used with or without an elastic bandage.

Stiff neck is also relieved, if neither dislocation nor a ruptured cervical disk is responsible, and if a trigger point can be located in neck or shoulder and pain reproduced by the needle.

Painful shoulder due to fibrositis, myositis, or bursitis may require only injection of the suprascapular nerve at the lower scapular notch, or infusion of procaine into the sore regions.

Chest pain of pleurisy, rib fracture, or surgical incision may be overcome by 2 or 3 cc. of procaine or up to 60 cc. of Eucupin-procaine solution injected near intercostal nerves.

Fracture is reduced with the aid of 10 to 20 cc. of 1 per cent procaine instilled into the hematoma at the site. For *dislocation*, solution is injected into the joint capsule.

Sciatica may respond to 10 or 20 cc. of 1 per cent procaine in the caudal canal, followed by 50 to 60 cc. of saline solution.

If no allergic or other cause is discovered for pruritus ani, 3 to 5 cc. of Eucupin-procaine solution is injected fanwise at each of four points, 3, 6, 9, and 12 o'clock, 1½ inches from the anus. Various oil solutions are employed for recurrence, for anal fissure, or to relax the sphincter during surgery.

Intravenous procaine is useful in many inflammatory or traumatic disorders, including osteoarthritis, obstetrics, and postoperative states. The usual dose is 4 mg. or 4 cc. of 0.1 per cent solution in saline or glucose per kilogram of body weight. The full amount is introduced in 20 minutes daily, weekly, or at longer intervals.

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STUDIES ON PAIN. II. Post-traumatic pain. From observations on 93 cases. J. F. P. ERASMUS, *South African M. J.* 25:601-604 (Aug. 25) 1951.

"It is distressing but only too true that trauma inflicted by certain therapeutic procedures, even in the absence of obvious complications, may itself be the starting point of a disabling painful state. The knife of the surgeon, the forceps of the dentist are as potent sources of such a state as the bullet of an enemy. The formidable list of 37 such instances encountered in the present study is summarized. . . . In the present series, cases of facial pain following legitimate dental practice have been particularly significant. Instances of trigeminal neuralgia wrongly treated by dental extraction have been rigidly excluded from the present discussions. Nine such cases were encountered. . . . Experience with some 150 British soldiers with major limb amputations gave the impression that severe, prolonged, intractable post-amputation pain is rare. Only two cases were seen. Most pains encountered in the group were rather transient affairs due to very obvious causes, among which sepsis in the stump and tightness of the flaps accounted for most cases.

"The illusion of the phantom is almost universal but it is seldom painful. Henderson and Smyth have described the feature of the 'natural phantom' in great detail from a study of some 300 amputees. Its behavior and evolution 'is as if the related cerebral centres were for a time in a state of heightened activity, the later subsidence of which results in telescoping of the phantom and its eventually fading . . . superadded sensations sometimes appear which are peculiar to the patient and are believed to be psychogenetically determined from the highest cerebral level. They may be mild, representing incidents in the patient's past experience, or, rarely, disagreeable severe spontaneous pain, distorted attitudes, and involuntary spasmodic movements dominating the phantom. The continuation in the phantom of pre-amputation pain or posture seems to be determined in many instances at least, by its psychological importance and not by its severity or duration.'

"The contention as to the cause of the painful phantom is an old one, figures like Descartes and Weir Mitchell have entered the lists. Some have stressed the role of a disturbed body image, others have given precedence to the bombardment of the sensorium by continued impulses from the periphery. Whatever the truth may be, there is no doubt that one can recognize two groupings of pain in amputees, first that referred to the stump or more proximally, second, that which is referred to the phantom. . . . It is obvious that the distal distribution of pain in some instances, without loss of a part of the limb, is not unlike that in a phantom part. [A case mentioned is that of an] old lady . . . a domestic attendant on the staff of a hospital. Two years before operation she had a fibrolipoma removed from the left side of the lower abdominal wall. Perfect, uncomplicated healing followed, but pain developed around the scar. This became severe and constant and occupied her whole attention. In 1947, a right upper dorsal spinothalamic tractotomy was performed. The pain on the left side disappeared forthwith but from the first post-operative day its exact mirror-image appeared on the opposite side of the abdomen and persisted to the time last seen, one year later, July 1948."

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STUDIES ON PAIN. III. Some observations on surgical treatment in 65 cases. J. F. P. Erasmus, *South African M. J.* 25:711-715 (Sept. 29), 1951.

"This work is not a review but deals with what has been encountered in the writer's experience. It ignores the overwhelming majority of cases, where the correct surgical treatment of pain is the direct removal or rectification of its cause and deals only with those where, for one reason or another, interruption of various neuronal pathways has been undertaken. Various syndromes, such as true trigeminal neuralgia, for example, are not included. Technical details of procedures will not be described. The types of procedure here considered fall into three main groups: A. Interruption of afferent pathways, or correction of pathology affecting these; B. Interruption of efferent pathways—sympathectomy; C. Section of association pathways.

"Operations on peripheral nerves . . . have included: Section of nerve, sometimes with subsequent suture; neurolysis (freeing from scar); excision of neuroma. The stump neuroma affords an excellent example of the effects of surgery on peripheral nerves. If the removal of such a neuroma once fails to bring relief, subsequent attacks thereon will never, or almost never, do any lasting good (White). Experience shows that even nerve section will then very seldom be of benefit. Neurolysis, though theoretically sound, gives very poor results in general, even when well done. It should be realized that, if our concepts of the pain-cycle are true, section of nerve produces what has been termed an artificial synapse—autonomic impulses and effects, if they are operative in a particular case, will re-stimulate the new free nerve-ending at the point of section (Nathan). . . .

"It is well to recognize the thesis of this artificial synapse, for it may operate anywhere at the point of section of any afferent nerve fibres—it is the basis of many cases of the distressing syndrome of post-traumatic pain. The present series affords 13 cases in which at least 16 operations of this type were performed. In only four instances did results appear satisfactory, but follow-up periods were 3 months, 3 months, 10 months, and 3 years—only the last being sufficiently long to substantiate any suggestion of cure. This case produced a particularly happy result, for a mass of adherent cauda equina had to be stripped free of dense adhesions following the operative removal of a prolapsed intervertebral disc. . . .

"The injection of a solution of alcohol into the theca, and appropriate posturing of the patient to bring the solution in contact with the posterior nerve roots, serves a similar purpose and seems especially useful where expectation of life is particularly limited by virtue of advanced malignant disease. Seven cases were encountered. The folly and tragic ineffectiveness of . . . [one] case has already been indicated. [Another case] was followed for only six months, but anything that gives relief for post-herpetic neuralgia for this time may well be permanent and even if not is still very much worthwhile. . . . Hydronephrosis developed . . . [in one case] subsequent to operation and raises an interesting question as to the rôle of nervous innervation in its causation. The tabulated record of the other three cases . . . [emphasizes] the heavy toll of untrained surgery in the treatment of prolapsed intervertebral disc. . . .

"Section of the spinothalamic tract is, to a surgeon trained in neurosurgery a minor operation, but unfortunately is often required in very ill patients. Despite many expressions of opinion to the contrary, usually copied from others with no practical experience of the operation, there are no crippling disabilities after a properly executed section of the lateral spinothalamic tract.

"In view of these [cited] anatomical facts the operation must be undertaken at a considerable level above the site of the pain. It is almost invariably performed at the eighth cervical or first thoracic neurological segments. Even this cannot be expected to relieve pain that extends above the general level of the xiphisternum. In addition, if the conception of a bilateral conduction of spinothalamic sensation is correct, many disappointments are to be expected from unilateral tractotomy. . . . Chordotomy has been used in 13 cases in the series. Seven of these were gravely ill patients with very poor general condition, six were doomed by advanced malignancy, one of these had already had in addition four episodes suggesting pulmonary embolism over the preceding few months. The seventh was referred in desperation by the Groote Schuur Hospital Diabetic Clinic, where his diabetes could not be controlled nor his severe pain relieved."

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STUDIES ON PAIN. III. Some observations on surgical treatment in 65 cases. ERASMUS, J. F. P., *South African M. J.* 25:722-725 (Oct. 6), 1951.

"The sympathetic denervation of a painful part must be complete, otherwise it will be useless. To achieve this adequate exposure is all important; it is significant that one sees pain that persists after sympathectomies carried out through incisions that cannot possibly give sufficient access to the deeply-lying sympathetic chain and its rami. The operations can sometimes be quite difficult enough without trying to work through buttonholes.

"Two types of procedures have been observed in this series—chemical sympathetic interruption with novocain or alcohol, and operative sympathectomy. In 24 cases chemical interruption was performed. In most instances this was for post traumatic pain, mainly in soldiers, who were sometimes evacuated to the United Kingdom within a few weeks, in others observation could continue for up to seven months after blocks. Three soldiers were returned to full duty within three to six weeks. It is instructive to note that a post-traumatic painful state of some months' duration was given dramatic relief by only one paravertebral injection of novocain in seven instances. In others multiple injections were necessary. Temporary or partial relief was obtained in seven instances. The result was quite unsatisfactory in two instances.

"Sympathectomy had been performed elsewhere in three cases, which were referred because of unsatisfactory result. In two this could be attributed to inadequate denervation. In one case an adequate procedure had undoubtedly been performed; the issue was complicated by a chain of unfortunate domestic troubles and a strong suspicion of wilful perpetuation of a large chemical burn. In eight other sympathectomies an unsatisfactory result was noted in one instance.

"White has re-emphasized the value of sympathectomy in abolishing pain from heart, aorta and abdominal viscera, and its lack of value when the majority of afferent fibres run in the vagi or sacral nerves, as with œsophagus, bladder or cervix uteri. He also affirms the value of this 'safe and harmless' type of procedure in controlling post-traumatic pains.

"Experimental, clinical and anatomical studies have indicated an association between cortex and thalamus via cycles of to-and-fro projection pathways. It is starting to look as if, in its broadest interpretation, the ultimate awareness of sensation, probably including pain-perception, or perhaps pain-creation, is dependent upon the interplay of large areas of subcortical and cell masses not in juxta-position with one another.

"The mass human experiment of prefrontal leucotomy has illustrated the immediate importance of cortico-thalamic connections. Its more recent application in the treatment of intractable pain has indicated its place in modifying the affective component therof. It is commonly stated that the patient still has pain but it no longer distresses him, though this threshold for appreciation of externally applied stimuli of physical nature remains unimpeded. Experience with this procedure for pain relief in this series is very small but, from a more general experience of the operation, it can be stated that a distinct danger lies in the apparent simplicity of this operation, and it is feared that it might be undertaken too lightly. The number of cases in which the operation has had to be repeated, for indications other than pain, has shown that it is only too often not done properly. The number of individual technical variations that are creeping into this operation, only some of which have been published, indicates a general dissatisfaction among neuro-surgeons, who are trying to see more of what they are doing without making the operation a major undertaking.

"White considers that frontal leucotomy is not justified if pain can be eliminated by other means. When it is necessary, unilateral section should first be done. In 11 of 13 cases this gave adequate relief, 'especially if the patient lived for only a few months.' Section of the opposite side is indicated by recurrence of pain—the staged procedure produces less severe mental disturbance than the initial bilateral section.

"Scarff reported on 58 cases of unilateral prefrontal lobotomy for pain. In 66 per cent there was no further voluntary complaint of pain and no need for narcotics—many cases have died within a few months of the basic illness, and the average follow-up was five months. In 20 per cent partial relief was obtained and in 14 per cent there was no control of pain . . . . caused by stimuli to the skin. Stender, of Berlin, reports relief from a case . . . . arising from an attempt at suicide, by unilateral prefrontal leucotomy—follow-up was for five months. More precise methods of thalamotomy and mesencephalo-thalamotomy, using a stereotaxic instrument and making electrolytic lesions in the dorsomedial nucleus of the thalamus, or in the spinothalamic tract in the midbrain are in the process of development (Wycis and Spiegel). Attention has previously been drawn to the earlier disappointments in removal of post-central cerebral cortex for pain. Bailey has subsequently reported on the failure of such procedure to relieve pain.

"Certain causes of failure of surgical treatment seem clear enough, especially if we come to recognize circuits of neuronal activity rather than isolated conducting pathways, and even more especially if we accept peculiar integrations within these circuits by facilitation. There is an analogy to the mechanisms and surgical treatment of epilepsy."

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LOCAL PROCAINE BLOCK AS AN ADDED MEASURE TO OVERCOME VENOSPASM DURING CARDIAC CATHETERIZATION. SALVATORE M. SANCETTA, M.D., *J. Lab. & Clin. Med.* 34:638-639, 1951.

Catheterization of the heart is sometimes forestalled by venous spasm in the arm. Focal tension should be relaxed by procaine to prevent involvement of the entire channel from the point of entry to the subclavian vein. Using a 2 per cent solution, Salvatore Sancetta, M.D., of Western Reserve University, Cleveland, successfully completed seven of nine interrupted examinations.

As spasm develops in a vein, the catheter is moved with increasing difficulty, and pain is felt for 1 cm. or more between the elbow crease and the axilla. The involved area should be infiltrated liberally, and if injection is effective both pain and tension are promptly abolished.

This is the fourth in a series of letters to Dr. J. A. Myers and the readers of the Journal-Lancet *from Dr. Ancel Keys, director of the laboratory of physiological hygiene at the University of Minnesota, during a year of study and travel abroad. Other letters will follow in subsequent issues.*

Notes from a Medical Journey

20 December 1951, Oxford, England

Dear Jay,

Frost lies thick outside the window and I can picture the white land of Minnesota and the Dakotas, with the thermometer shivering at twenty below - while it is apt to be eighty in the houses. None of these shocks of thermal change for us here; walking out of doors is warmer than sitting inside and if I had my Minnesota stormcoat here I should use it as a house jacket. But it is colder in Scotland as I discovered last week. Several sessions of a Combined Conference, of which I may not speak more fully, were held at Aberdeen where the gray granite buildings and houses properly match the climate and the Scots are more chary with fuel than the Britons.

A main interest for the quizzical participant in such intergovernmental conferences is the association with officialdom. The delegates, at least the conscientious (or tame?) ones, desperately flounder about in an effort to find a "formula" to conceal the disagreement which descends from their official instructions. High policy and the particular road to heaven to insist on where long ago decided by their superiors in Cabinet or Ministry. Plain medicos and scientists must never examine big issues with only technical knowledge, common sense and goodwill at their disposal. Perhaps the main difficulty is that crucial facts are usually missing so by default the technical expert must go along with the compromises beloved of politicians.

But between things there are always other interests to cultivate in such conferences. For instance, a responsible official who is well placed to judge things here, confided to me his belief that the medical service to the British middle classes has worsened though for most of the people the National Health Act is a real blessing. The plain fact is that there are not enough doctors and if there were it would mean a new crisis to find the money to pay them and the costs of all the services they would demand to provide the best practice of medicine.

I suppose I should not speak about the practice of medicine since my own contacts are with the academic medical scientists. The standards in the medical schools are as high as anywhere at home and the students are a superior lot, to judge from Oxford and Cambridge where they have every opportunity to develop independence of thought. Among other things, this means they go to such lectures as they think fit and this explains my satisfaction with the outcome of my three lectures at the close of term. With an audience including Professors R. A. Peters, Liddell and C. G. Douglas, as well as Dr. H. M. Sinclair and Sir Robert McCarrison, I did not primarily aim at interesting the students. But even the last lecture was well attended though I had been warned that students rarely attend more than the first of a special series.

Now to prepare lectures for Edinburgh, Aberdeen and Glasgow next month. These are to be formal affairs - the Edinburgh one is the Macarthur Memorial (not the General) - and in alternate lectures I shall talk on the gross composition of the body and on cholesterol, lipoproteins and atherosclerosis. Neither of these subjects has had much attention here except for Professor R. A. McCance at Cambridge who is working on body composition. McCance has a very big name here but I think he is behind us at Minnesota on the subject of the composition of the body and its physiological significance. Anyway, Dr. Brozek and I had better get busy and publish more of our own findings if we are to keep ahead of a field that is rapidly creating interest.

In the meantime, the children are home for the Christmas holidays of four weeks and there is a problem to keep them busy and out of my way at work. Until now I have been working mostly at home but I may have to abandon these small quarters for a more dismal spot in a frigid laboratory. The children, incidentally, thrive exceedingly. So far they have picked up fewer British mannerisms of speech than of deportment - they are so polite I inquire anxiously about their health. Caroline, aged eleven, is making some progress with French so she readily becomes a foil for her mother's efforts to turn her own twenty-year-old recollections of the language into something that will carry us through France. At nine (last month) Henry is just starting Latin without visible success or pleasure. I ought to get busy too as there seems to be some ill-founded expectation that I will come up with the right answers as needed in German, Spanish, Italian and the Scandinavian languages. The great disillusionment will begin when we set off to work in Italy in February.

We propose to drive in our new Hillman, a prospect which would be more inviting if there were no such problems as customs, permits, currency and language. The latter one could cope with, but the complications man has created for himself, through his governments, passeth understanding. And when it comes to complications, our own government is right up there competing for top honors, we must admit. Taxes and customs duties are bad enough in themselves but why do they have to involve such endless rigamarole?

This letter wasn't meant to end on a note of ill humor and we must forthwith cease talk of governments and think of the holidays at hand and all the good wishes for the New Year I send to you and our friends at home.

Sincerely yours,

Ancel Keys

Lancet
CLINICAL
REVIEWS

This new department of The Journal-Lancet *is devoted to reports on cases in which all appropriate diagnostic criteria have been employed, the best known treatment administered and the results recorded. It is desired that these case reports be so prepared that they may be read with profit by physicians in general practice, hospital residents and interns and may be of considerable value to junior and senior students of medicine. This department welcomes such reports from individuals or groups of physicians who have suitable cases which they desire to present.*

Hyperpotassemia

C. D. CREEVY, M.D.* and M. P. REISER, M.D.
Minneapolis, Minnesota

Mrs. A. M. H., aged 23, University Hospital No. 831173, was admitted on April 10, 1951. Since September 1948 she has had intermittent pain in the left costovertebral angle which occasionally radiated along the course of the left ureter. In March 1949 appendectomy and removal of a left ovarian cyst were performed elsewhere. About eight weeks prior to admission, during the last trimester of pregnancy, severe pain in the left costovertebral angle recurred and persisted. It was associated with nausea and vomiting. During this time she had gained 40 pounds and had developed edema of the face and ankles and some degree of hypertension. For two days prior to delivery she had passed "scanty amounts of urine only once or twice a day." On April 1 she gave birth to a seven pound boy. For two days thereafter she felt better: the pain was less severe, she was no longer nauseated, and began to void larger amounts of urine more frequently. On April 3 nausea and vomiting recurred, the pain again became severe, and scanty amounts of urine, about one or two ounces, were voided once or twice a day. Four or five days prior to admission the daily fluid intake was reduced to 400 to 600 cc. orally because of the nausea and vomiting. For two days preceding admission she noticed "difficulty in breathing," marked weakness, numbness, and tingling of the extremities. The urine output was but a few cubic centimeters and catheterization of the bladder yielded no urine. She had never received a transfusion of blood.

Physical examination on admission revealed an afebrile acutely ill 23 year old white female who was breathing with great difficulty, using the accessory muscles of respiration. The blood pressure was 150/100, the pulse 88, and respirations were 40 per minute. Eyes, ears, nose and throat were normal. There was evidence of left ventricular enlargement with normal sinus rhythm and an apical systolic murmur. Coarse and fine rales were heard at both lung bases. Abdominal palpation disclosed a large, tender, soft mass which moved with respiration and extended from the midline of the abdomen to about one inch above the anterior superior spine of the ilium inferiorly and into the left costovertebral angle laterally. The ankles and lower legs were a little edematous and all four extremities were somewhat flaccid; she could move them only with great difficulty because of weakness. No urine was obtained upon catheterization.

On admission the hemoglobin was 11.2 grams and the white blood count 10,450 with neutrophils 75 per cent, lymphocytes 20 per cent, monocytes 4 per cent, and basophiles 1 per cent. The urea nitrogen of the blood was 152 mg. per cent, the carbon dioxide combining power of the plasma was 14 milliequivalents, the plasma chlorides were 102 milliequivalents, the serum sodium was 145 milliequivalents, and the serum potassium 9.5 milliequivalents (normal 4.4 to 5.9 milliequivalents). Roentgenograms revealed enlargement of the heart and passive congestion of both lungs. The electrocardiogram showed prolonged PR intervals and peaked T waves consistent with hyperpotassemia (figure 1).

Cystoscopic examination performed one hour after admission revealed no urine in the bladder. The right ureteral orifice was identified but could not be catheterized. The left ureter was catheterized with a No. 6 ureteral catheter and there was a rapid drip of very dilute urine when the renal pelvis was reached. Because of the elevated serum potassium, 2000 cc. of 10 per cent dextrose in distilled water with 40 units of regular insulin

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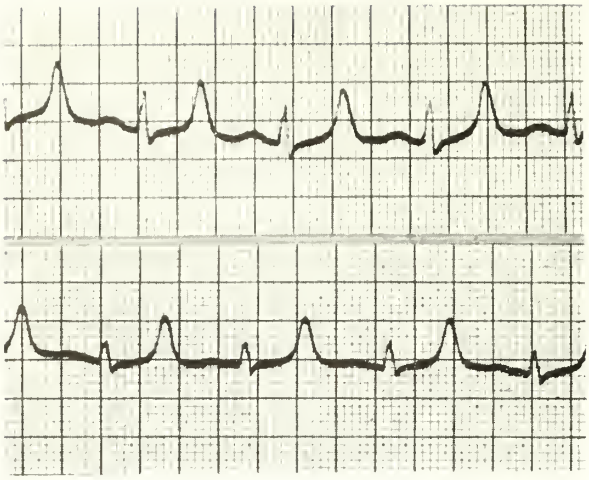

Fig. 1. Ekg leads I and II; peaked T waves, prolonged QT interval, P waves almost absent in lead II.

were given when the patient returned to the ward. The next morning she could lie supine without respiratory difficulty and partook of "her first hearty meal in the past four weeks." Within 48 hours she had lost 17 pounds, and 12,700 cc. of urine had drained from the ureteral catheter; the edema had disappeared, and the mass in the left upper quadrant had decreased considerably in size and was no longer tender. On April 11 the serum potassium was 5.8 milliequivalents and the blood urea nitrogen was 79 mg. per cent; the electrocardiogram was reported as borderline normal. The urine output was maintained at 4,000 cc. with an adequate fluid intake; the blood urea nitrogen returned to normal level on April 18, 1951. At that time the blood pressure was 120/78. Pyeloureterograms revealed a large left hydronephrosis with compensatory hypertrophy and a noncalculous obstruction of the ureteropelvic junction (figure 2). Only an ureteral bud was present on the right. Ureteral catheter drainage was continued until April 19, 1951, at which time a Schwyzer-Foley Y-plasty was done by Dr. C. D. Creevy. The kidney was twice the length and one and one-half times the thickness of a normal kidney; the renal parenchyma had been thinned out by the hydronephrosis, but the amount remaining was estimated to be at least equivalent to that of a normal kidney. No obstruction of the ureteropelvic junction could be identified, but its absence might have been due to dilatation from the prolonged use of an inlying catheter. A thick layer of fascia surrounded the dilated renal pelvis and upper ureter. The postoperative course was complicated only by a well localized thrombosis in the left saphenous vein. The latter was treated by bed rest and elevation; anticoagulants were not used because of the recent operation.

A paracolon bacillus was cultured from the urine prior to discharge from the hospital on May 11, 1951. After two weeks of treatment with dilute nitrohydrochloric acid, calcium mandelate and acid ash diet, the urine culture was reported as containing Escherichia coli. The above regimen was stopped because we were unable to keep her urine acidified, and she was placed upon Gantrisin 2 grams and Chloromycetin one-half gram four times a day to treat the urinary infection; Basaljel one ounce three times a day was prescribed to decrease the excretion of phosphorus in the urine. Two subsequent urine cultures were reported as sterile and on June 26, 1951 all medication except Basaljel was stopped. On July 30, 1951, Escherichia coli was cultured from the urine and she was instructed to take 0.5 g. sulfadiazine four times a day. On August 20, 1951 urine culture was again sterile.

On June 5, 1951 an excretory urogram revealed left hydronephrosis with delay in excretion but the urine passed down the ureter and drainage appeared adequate.

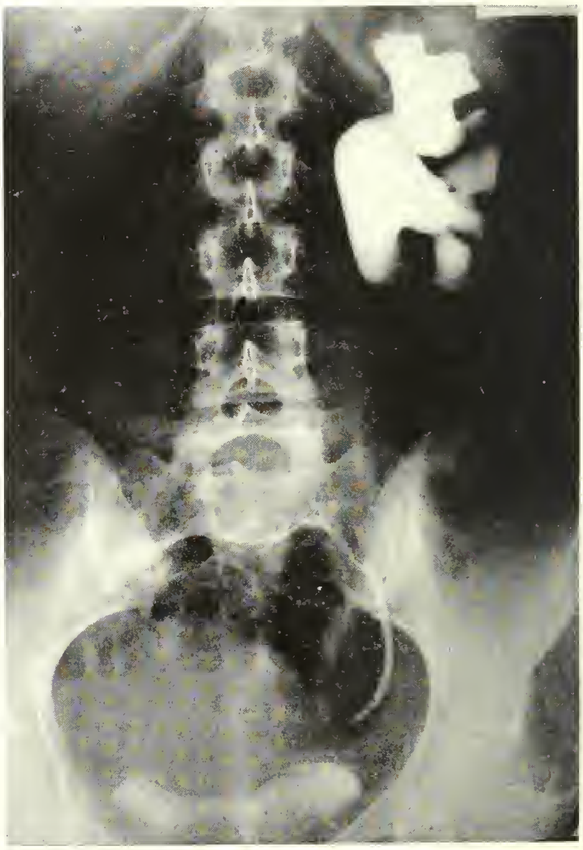

Fig. 2. Solitary kidney with hydronephrosis due to noncalculous obstruction of the ureteropelvic junction.

DISCUSSION

Whereas the noncalculous obstruction of the left ureteropelvic junction had doubtless been present since birth, the patient managed to get along fairly well with few symptoms until pregnancy. The hydronephrosis of pregnancy superimposed upon the congenital anomaly resulted in further impairment of drainage from the kidney. As a result the hydronephrosis became progressively more severe until a large tender kidney could be palpated. The elevated intrapelvic pressure resulted in a diminution or complete suppression of secretion of urine by this solitary kidney, which in turn was manifested by the anuria, uremia, and hyperpotassemia. As soon as adequate drainage of the solitary kidney was established, diuresis with the resultant decrease of the elevated serum potassium and blood urea nitrogen occurred, indicating that the impaired renal function was reversible to some extent. Diuresis alone would not reduce rapidly enough the almost lethal level of serum potassium; therefore intravenous glucose and insulin were given to drive the potassium from the plasma into the cells, and drainage with an inlying ureteral catheter was initiated at once to permit resumption of urinary secretion.

POTASSIUM

Only recently has it been generally understood that shortages or excesses of potassium in the body may occasionally become important in the surgical patient. The normal adult requires about four grams of potassium per day, and the average daily diet contains six to nine grams expressed as potassium chloride. It is absorbed from the intestine, and most of it is taken up by the cells, in which part of it is bound to protein, and part is in solution in the intracellular water. Intracellular water contains 140 to 160 milliequivalents of potassium per liter, while the serum contains but 4.1 to 5.6 milliequivalents (16 to 22 milligrams per cent). Of the total of 160 grams of potassium in the body, only 2.7 grams are in the extracellular fluid. The gastric juice contains up to 40 and the intestinal juices up to 10 milliequivalents per liter, most of which is re-absorbed in transit through the bowel.

In addition to serving as an electrolyte and as a basic ion it determines, with calcium and magnesium, the degree of irritability of nerves and striated muscle, both skeletal and cardiac. An increase in the concentration of potassium or a reduction in calcium increases muscular irritability in vitro.

Any excess of potassium is excreted by the kidneys, which maintain a constant minimum rate of excretion even while no potassium is being ingested, so that long continued starvation will cause deficiency of the ion in the body. In addition, the potassium in the gastric and intestinal juices is lost during protracted nasal suction, thus accelerating the development of a deficiency. The loss in such circumstances is increased by the intravenous administration of large amounts of saline, the sodium from which enters the cell in place of the lost potassium, and so may produce alkalosis. Younger patients lose their potassium more readily than do older ones in these conditions. Deficiencies also occur in diabetic acidosis treated by large amounts of intravenous fluid, especially saline; in adrenal cortical insufficiency overtreated with desoxycorticosterone or cortical extract; in an occasional case of renal insufficiency; in severe dehydration from prolonged diarrhea in infants; and during recovery from a severe hemolytic reaction. The potassium content of the plasma may fall during the uptake of glucose by the cells such as results from the use of adrenalin and insulin, but this is so mild and transitory as to be unimportant unless a severe deficiency is already present.

Potassium deficiency is likely to go unrecognized unless the clinician bears it in mind because it is characterized at first only by anorexia and weakness. When more advanced, it produces characteristic changes in the electrocardiogram easily recognized by the cardiologist. Later still, flaccid quadriplegia and even cardiac failure may occur.

It should be suspected in the starved patient, especially when nasal suction and parenteral feeding have been used for long periods, in those with diarrhea or diabetic acidosis, in unexplained muscular weakness, and in adrenal cortical deficiencies being treated with hormones. Serum potassium should be measured whenever one encounters an unexplained hypochloremia and alkalosis. The electrocardiogram will show characteristic changes when the serum potassium drops below two milliequivalents.

Treatment can consist of oral administration to the patient who can eat of four to six grams of potassium chloride in orange juice each day; of 4 to 8 cubic centimeters of 20 per cent potassium citrate four times daily; or of Valentine's meat juice four tablespoons several times daily.

For patients unable to eat, sterile potassium chloride may be added to the intravenous fluid. Since a sudden rise of the serum potassium to a level above 7 to 10 milliequivalents per liter may cause cessation of the heart beat, the concentration of potassium in the intravenous fluid should not exceed 2 to 5 grams per liter, and the rate of administration should not exceed 12 cubic centimeters (180 drops) per minute. Since a slight decline in the serum potassium may represent a large loss from the cells, considerable time and large amounts of potassium may be required to restore balance. Moreover, studies with radioactive potassium have shown that injected potassium requires fifteen hours to reach equilibrium in the body.

Retention of potassium occurs with oliguria, anuria, and uremia especially if potassium is administered; during the rapid breakdown of tissue when the rate of release into the extracellular fluid may exceed the rate of excretion, particularly if the kidneys are diseased; during dehydration, and in adrenal cortical insufficiency. It is usually important only in an occasional case of uremia and in Addison's disease.

At first the only clinical manifestation is likely to be paresthesias of the hands and feet; curiously enough, flaccid quadriplegia may occur here also. When the serum level risees, characteristic electrocardiographic changes occur, leading to an irregular rhythm and finally to cardiac arrest.

Serum potassium should be measured and an electrocardiogram made in any uremia of long standing. If evidence of hyperkalemia is found, calcium gluconate or chloride should be given intravenously for the specific antagonism of calcium to potassium; glucose should be given in 10 per cent solution or higher because both an increase of glucose in the blood and the injection of a hypertonic solution appears to drive potassium from the plasma to the cells. This effect is increased by adding 30 units of insulin to each liter of 10 per cent glucose. If diuresis cannot be secured, failure is likely, with death from cardiac arrest.

Whereas the injection of hypertonic glucose and insulin produces only temporary reduction of the serum potassium, in the absence of diuresis other methods may be used. Oral administration of carboxylic acid resins while effective is usually not well tolerated by a patient who is already nauseated and vomiting. Peritoneal dialysis, intestinal lavage and the artificial kidney are effective in reducing the serum potassium.

Clinicopathological Conference*

Minneapolis Veterans Hospital

Edited by JAMES F. HAMMARSTEN, M.D.
Assisted by N. L. GAULT, M.D. and R. I. LUBIN, M.D.
Minneapolis, Minnesota

PRESENTATION OF CASE

First Admission: A 36-year-old farmer was admitted to this hospital on April 27, 1951 because of a right inguinal hernia. Otherwise physical examination was negative.

Urinalysis was negative. Hemoglobin was 13.4 g. per 100 ml., and the white blood cell count 6100 with 64 per cent neutrophils, 33 per cent lymphocytes, 1 per cent monocytes, and 2 per cent eosinophils. The erythrocyte sedimentation rate was 7 mm. in one hour. A blood Kahn was negative. An x-ray film of the chest was negative.

Herniorraphy was performed and he was discharged on May 9, 1951.

Second admission: He was readmitted to this hospital on July 14, 1951 because of abdominal pain and weight loss. He was well until six weeks prior to admission. At that time he noticed the gradual onset of dull pain in the epigastrium which increased in severity and became sharp in character. After one week the pain radiated to his back just beneath the scapula on both sides. It was constant and was not related to meals. There was no relief with milk, aluminum hydroxide gel, or Banthine. For one week prior to admission the pain was so severe that he could not work.

On five or six occasions he believed he had fever and he was apt to vomit at these times. There were no chills. His stools had been light colored for two days before admission. He had lost 14 pounds during the six weeks before hospitalization.

He denied hematemesis, melena, and jaundice. He drank raw milk frequently but none of his cows had Bang's disease. He denied any alcoholic intake recently. His father was living but had diabetes mellitus.

The patient was examined by his local physician and a gastrointestinal series was reported to show an ulcer which "probably had ruptured." He was referred to this hospital for further studies.

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*Published with approval of Chief Medical Director. The statements and conclusions published by the authors are the result of their own study and do not necessarily reflect the opinion or policy of the Veterans Administration.

Physical examination showed a chronically ill pale man with hollow cheeks. He was complaining of severe pain in the epigastrium. The abdomen was scaphoid and there was voluntary guarding of the upper abdomen. A tender, rather hard, orange-size mass was palpable in the epigastrium extending somewhat to the right. The remainder of the examination was negative.

The temperature was 100° F., pulse rate 96 per minute, and blood pressure 140 mm. Hg systolic and 90 diastolic.

An admission hemogram revealed hemoglobin of 12.2 g. per 100 ml., and white blood cell-count of 10,950 per mm.^{3} with 75 per cent neutrophils, 23 per cent lymphocytes, 1 per cent eosinophils and 1 per cent basophils. An erythrocyte sedimentation rate was 72 mm. in one hour. A blood Kahn was negative. A urinalysis demonstrated an acid reaction, a specific gravity of 1.032, a faint trace of albumin, a negative test for reducing substances, occasional hyaline and granular casts per low power field and two to four white blood cells with occasional red blood cells per high power field.

The serum amylase was 226 units and decreased to 128 units by July 17, 1951. Fasting blood sugar was 105 mg. per 100 ml. The serum protein was 6.0 g. per ml. with 4.8 g. albumin and 1.2 g. globulin. The one minute serum bilirubin was 0.1 mg. per 100 ml. and the total 0.2 mg. Bromsulfalein retention was 10 per cent in 45 minutes. The cephalin flocculation test was negative in 48 hours. Prothrombin time was 17.1 seconds with the control 12.5 seconds. Gastric analysis showed no free H Cl and 18° total acidity with 6° free and 24° total after histamine injection. The stools were negative for blood, fat, undigested meat fibers, ova, and parasites.

X-ray films of the chest were negative. X-ray films of the abdomen without barium showed moderate distension of the colon with gas and fecal material. There was no evidence of small bowel distension and no free gas was seen in the peritoneal cavity. The duodenal bulb appeared to be distended with air and there was some questionable narrowing of the antral portion of the stomach. A barium meal also showed some questionable constriction of the antral portion of the stomach. The upper jejunum appeared to be displaced upward. A cholecystogram was negative.

He continued to complain of abdominal and upper mid-back pain which required demerol for relief. His temperature rose to 101° to 103° daily and he perspired profusely. Penicillin had no effect on the temperature. He appeared to be weak. On July 27, 1951 an operation was performed.

DISCUSSION

DR. NESBITT[*]: May we see the x-ray films.

DR. STERNS: The interpretation of the x-ray films is fairly well described in the protocol. There is some peculiar narrowing in the antrum of the stomach. The best we can say is that it looks abnormal, but we cannot put a name on it.

DR. EBERT: It states in the protocol that the upper jejunum was displaced upwards.

DR. STERNS: I don't think so.

DR. NESBITT: Did you ever get a good film of the duodenal sweep?

DR. STERNS: No.

DR. NESBITT: The picture then is that of an acute unrelenting illness characterized by severe epigastric and back pain associated with fever, weight loss and some vomiting. I have been intrigued by the thought, which his local doctor shared, of a perforating gastrointestinal lesion resulting in a walled-off inflammatory mass. Occasionally we must realize that perforation of a simple peptic ulcer is the first symptom. I note that this patient did receive specific ulcer management. I wondered, too, since his local doctor was thinking of a perforating lesion with a penetrating gastrointestinal lesion, whether he had been given antibiotic therapy because he does not have a leukocyte response which one might expect to find in such a condition. Do we know about that?

DR. HAMMARSTEN: He had received no antibiotics prior to coming to this hospital.

DR. NESBITT: That, too, is rather against the thought as is the absence of any roentgenological findings of such a lesion in this hospital. It would be hard to conceive of an ulcer having healed and not showing x-ray findings after such a catastrophic event. Also militating against the possibility of a simple peptic ulcer is the absence of free hydrochloric acid and only a slight response to histamine.

And so we might consider more seriously, perhaps, the thought of a carcinoma of the stomach. Statistically, a palpable mass in the epigastrium is most often due to this condition. Again we must recall that perforation or penetration is occasionally the first symptom in carcinoma of the stomach, although this is even more unusual than it is in the case of a simple peptic ulcer. However, chronic perforation with walling off of an ulcerating carcinoma, as we have mentioned, is most unusual. When it does occur, it may penetrate between the layers of the gastrohepatic omentum or against the under surface of the liver. More often it is into the pancreas. I should imagine that such a lesion by this time should have produced a parenchymal defect. The absence of blood in the stools, too, is very much against this possibility.

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[*] Associate professor of medicine, University of Minnesota, and attending physician, Veterans Hospital, Minneapolis, Minnesota.

Also, we know that cholecystitis with rupture of the gallbladder may result in a picture much as we have it related in this instance, including a palpable abdominal mass. However, again the absence of a leukocytosis, the fact that he has had no previous story of gallbladder distress, and the presence of a normal functioning gallbladder by x-ray examination all rule against the thought of such a catastrophe.

In passing we might mention that a palpable epigastric mass as a result of enlarged abdominal lymphatic glands representing tuberculosis, lymphoma, or metastatic malignancy, is by far a most uncommon occurrence. Although symptomatically these conditions are extremely varied in their clinical picture, I think also that any of these would be most unlikely to result in the fulminating illness from which this patient was suffering.

Pancreatic lesions account for most epigastric masses which are not gastric in origin. First, I think we should consider carcinoma of the pancreas. The type of pain which this patient presented, with its epigastric location and particularly with penetration to the back, is very characteristic of carcinoma of the pancreas. About 50 per cent of patients with carcinoma of the pancreas exhibit pain as the initial symptom. I like to stress that point. Again I might say that the abrupt onset is in keeping with carcinoma of the pancreas. With this thought in mind one notes that although there is no glycosuria, this patient did have an elevated fasting blood sugar. In this connection we must note also that his father had diabetes and for that reason the patient's hyperglycemia may be unrelated to his present acute illness. The amylase value is within normal limits. In carcinoma of the pancreas at some time during the course of the disease the serum enzymes may be elevated occasionally. In this regard the serum lipase is more frequently elevated than is the serum amylase. Among the laboratory studies which might be of assistance would be the determination of the duodenal contents, but this is a laborious process and is being done in only a few centers and only as a research project. I think we have to consider seriously the possibilities then of carcinoma of the pancreas. Against it, I feel, is the absence of confirmatory evidence—even the hyperglycemia is not incontrovertible evidence as it might otherwise have been in the absence of family history of diabetes. We have no studies by x-ray, particularly the barium meal, which might be helpful in pointing toward the displacement of the duodenal sweep by an expanding lesion in that area. Perhaps the fact of such a large lesion presumably in the head of the pancreas in the absence of jaundice does militate against the possibility of carcinoma of the pancreas, though I think we cannot disregard it as a possibility.

I think the most likely possibility is that of pancreatitis with a large pseudocyst which is palpable. Again the nature of the pain with penetration to the back is good evidence. The onset of the pain is particularly good—a dull, aching pain in the mid-epigastrium which progresses relentlessly in severity and eventually goes through to the back and then acquires waves of more severe, sharp pain—all good evidence for the pain of pancreatitis.

I note in the protocol that this patient has not indulged in alcohol recently. "Recently" is a relative term. Is it possible that he may have indulged in alcohol about the time of the onset of this illness?

DR. HAMMARSTEN: That was the only statement in the record regarding his alcoholic intake.

DR. NESBITT: That would be of some help because we do know that pancreatitis very frequently has its inception following the use of alcohol, occasionally a large meal, or a combination of the two. Again pancreatitis need not be associated with a leukocytosis, although more often than not the count ranges between ten and twenty thousand, and sometimes higher. Again the hyperglycemia would fit into the picture of pancreatitis as a helpful bit of evidence; except, as we have mentioned previously, for the family history of diabetes. The amylase being within normal limits at this stage of the game does not help us at all. To be of real help the serum amylase must be determined early since it rises quickly with the onset of pancreatitis, to attain its highest values within 12 to 24 hours and may decline within hours or days, usually being normal within from 10 to 14 days, although it does remain elevated occasionally for weeks or months. In this connection one test might be of help, and that is the determination of blood calcium. There is no possible chance that we do have that hidden in the record?

DR. HAMMARSTEN: No, we do not.

DR. NESBITT: Blood calcium is occasionally lowered during an attack of pancreatitis. Having but one choice I am going to elect a pancreatitis with a pseudocyst.

A RESIDENT: I would like to ask Dr. Nesbitt if the fall in serum amylase is significant?

DR. NESBITT: No, I don't believe it is of any significance. It may vary from day to day.

DR. HAGEN: Did I hear you right—that when this patient was in three months before this admission he had a hemoglobin of 13.4?

DR. HAMMARSTEN: That's correct.

DR. HAGEN: And he was apparently healthy at that time? I think you have to explain that anemia that he had three months before he came in. It makes one wonder if the man had a lymphoma.

DR. BELL: 13.4 is an anemia. Isn't that right?

DR. HAGEN: 13.4 in this hospital in the male population is an anemia. Any time we see in our records a hemoglobin of under 14 we have to be suspicious.

DR. EBERT: That's right; suspicious that the patient is sick, but certainly anybody with chronic infection could have this degree of anemia.

DR. HAGEN: He did not have a chronic infection at the time of the herniorraphy on his first admission.

DR. BELL: I think Dr. Hagen has an important point. This man had something wrong with him three months ago and that would be brought out by that anemia.

DR. EBERT: Doesn't it bother you that the white count wasn't a bit higher with the acuteness of the process, Dr. Nesbitt?

DR. NESBITT: No, not appreciably. Rather frequently the leukocyte count is perfectly normal.

A RESIDENT: I would like to ask Dr. Nesbitt if he feels he is required to explain the prothrombin time.

DR. NESBITT: That did disturb me. But I am not disturbed by the bromsulfalein at all in a severely ill febrile patient. I don't understand why the prothrombin time is definitely prolonged. Although we must realize that liver disease is not infrequently associated with pancreatitis. That is particularly seen in the old drunkard who staggers in during the middle of the night with severe pancreatitis. It is stated in the literature that parenchymatous liver disease is frequently associated with pancreatitis.

DR. HAMMARSTEN: Dr. Heller, you saw this patient. What was the clinical diagnosis?

DR. HELLER: Our diagnosis was the same as Dr. Nesbitt's.

A RESIDENT: The surgeons thought very strongly of carcinoma of the stomach.

DR. HAMMARSTEN: The students all voted with Dr. Nesbitt with the exception of one who thought the patient had a duodenal ulcer that perforated into the pancreas.

DR. EVANS: I didn't interpret the amylase in the minute, and blood pressure 140 mm. Hg. systolic same way Dr. Nesbitt did. I think that the lack of constancy of the serum amylase is one of the best evidences that the pancreas is involved. Are you satisfied that you have a satisfactory explanation for the abnormal appearance of the pylorus? I certainly like the diagnosis you made, but if it is going to be something with a joker, I would put in something with abnormal lymph nodes.

DIAGNOSES

Clinical diagnosis: Pancreatitis with pseudocyst.

Dr. Nesbitt's diagnosis: Pancreatitis with pseudocyst.

Anatomical diagnosis: Hodgkin's disease of abdominal lymph nodes and stomach.

PATHOLOGICAL DISCUSSION

DR. GLEASON: The operation was an exploratory laparotomy. A large firm mass which involved the stomach and nodes was encountered. Several nodes were removed. In the lymph nodes there were Dorothy Reed cells and a lot of reticulum in the background. The diagnosis is Hodgkin's disease of the lymph nodes of the abdomen. In another node the entire center was necrotic and it was necessary to search around the border for any evidence of malignancy.

DR. BELL: One of the big necrotic areas looked very much like tuberculosis. There is no reactive margin around that necrosis which differs from tuberculosis. Now in tuberculosis it is surrounded by epithelioid cells which we do not see here.

DR. HAMMARSTEN: The patient continued febrile after the operation. He was treated with deep x-ray to the abdomen. I think the radiologist has further x-rays that were made after the surgery which would be of interest.

DR. STERNS: During x-ray treatment the stomach showed more narrowing of the antrum with a filling defect along the greater and lesser curvature. The x-ray picture was that of actual involvement of the stomach. Our diagnosis from these x-rays would be carcinoma of the stomach.

DR. EBERT: I suppose that the elevated blood sugar probably indicated diabetes in view of the family history.

Lancet Editorial

INDIVIDUAL VARIATION IN TOLERANCE OF PAIN

Certain impressions are gained as one deals with patients who are in pain. These impressions are important if they can be rather definite. For example, it is impossible for the physician to feel his patient's pain himself; rather, as a rule he must depend upon what the patient says as a gage of the actual degree of pain the patient is suffering. There are, however, commonly used standard procedures, such as venipuncture or the raising of a skin wheal with a local anesthetic agent, which occasion a certain degree of pain in many people. These procedures are disagreeable to most people, but usually are not a source of serious complaint. Hence, an individual patient's reaction to some standard procedure causing relatively slight pain will give the physician an indication as to that patient's tolerance of pain. Such an impression can be useful in assessing a patient's report as to how much pain he suffers, and should be borne in mind when the physician is called upon to minister to a patient in pain.

Another impression that is gained in dealing with patients who have been in pain for a considerable time is that few if any people actually become accustomed to pain. The fact appears to be, on the contrary, that the longer pain must be endured, the less well it is tolerated. If current reports are valid, it would seem that inquisitorial groups have demonstrated this very well by their successes in breaking down a prisoner by exhaustion, long periods of questioning, and creating in his mind great fear and distress. In time he usually submits to the demands of his inquisitors.

The patient whose severe pain persists over a period of years sometimes reaches a point at which he may do away with himself. In the treatment of patients who have these prolonged periods of pain the physician must consider the fact that the threshold of tolerance for pain no doubt has decreased, meaning that although the pain suffered at the moment may be acute, it may be no greater than it was when it began. Yet the patient will complain of it, and say it is worse than it ever has been. Such a situation can lead to certain difficult problems. For instance, some patients have submitted to operations of considerable magnitude that were without ultimate benefit.

Some adult patients who complain of incessant or intolerable pain at times appear to have a condition which resembles anorexia nervosa as that state usually is seen in children. There are possibilities in the careful medical handling of such patients in a way which will build up their appetite, their weight, their ability to sleep, their ability to acquire a new viewpoint and new confidence in themselves, and a new ability to tolerate the pain they have.

It is hoped that, if there can be prepared a sufficient series of papers dealing with pain as one of the first reasons which prompts the patient to seek medical attention, in time the entire problem of pain in a single person may be attacked simultaneously from several points of view. If such a plan proves to be advantageous, it seems likely that eventually better results will be obtained than if, for intance, the point of view of one author were maintained for a period, followed by the point of view of another, and perhaps still another, without co-ordination among them. Hence, the decision which resulted in the presentation, in this issue of THE JOURNAL-LANCET, of a number of different approaches to the problem of pain.

John S. Lundy, M.D.

FIFTH AMERICAN CONGRESS ON OBSTETRICS AND GYNECOLOGY

The Fifth American Congress on Obstetrics and Gynecology will be held in Cincinnati, Ohio, March 31 through April 4, 1952, under the direction of the American Committee on Maternal Welfare. This will be the first meeting of the American Academy of Obstetrics and Gynecology.

For reservations write to *Housing Bureau, Fifth American Congress on Obstetrics and Gynecology, Dixie Building, Cincinnati, Ohio.*

BOOK REVIEWS

Anesthesia in General Practice, by S. C. Cullen. Third edition, Chicago: The Year Book Publishers, Inc. 292 pages. $4.50.

This book includes some of the topics which comprised a series of lectures by the author for medical students. These lectures were aimed at medical students, part-time anesthesiologists and others who might be called upon to employ depressant drugs, alleviate respiratory depression or obstruction and treat hypoxia or shock. In the present (third) edition, an attempt is made to keep the book up to date.

The author has covered the use of the depressant drugs as briefly and concisely as possible, and has given his opinion positively, even where points are controversial, so that the reader may feel that he has been positively informed. The tables on premedication dosage are very valuable, particularly for quick reference. The question of the airway is well covered, for the author realizes full well that an inhalation anesthetic agent must be inhaled and all efforts toward that end help. The inhalation agents and their characteristics are described briefly and are followed by a chapter on the technics of administration of these agents and the principles underlying those technics.

Spinal anesthesia is considered in detail. A chapter on regional, infiltration and topical anesthesia is added, and the author has made the best use of the limited space available to him. Some amusing caricatures are presented which drive home some of the right and wrong things to do in treating a cocaine or procaine reaction. The most commonly used block procedures are illustrated and presented without introduction of a great many of the rarely used blocks. Careful consideration is given to signs of anesthesia, which is followed by a section on the recognition and treatment of shock, which is so important to all.

Oxygen therapy is given considerable space, as is due its importance. A brief discussion is given on the preanesthetic and postanesthetic care of the patient; finally, there is a short chapter on explosion hazards which closes with the statement, *There is no device that can substitute for the constant alertness and consciousness of the anesthetist of the hazards associated with the use of explosive agents.* The appendix gives a list of anesthetic agents available for office use. This is followed by an index.

This book should be of real value to the group for whom it was intended. J.S.L.

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Chloroform: A Study After 100 Years, by R. M. Waters, 1951. Madison, The University of Wisconsin Press. 138 pages. $2.75.

Those who are interested in the use of chloroform will find in this book a careful evaluation of the agent when and as it is used skillfully and in a modern hospital. The volume describes the effect of chloroform on hepatic function. Sixty-five patients who were anesthetized with chloroform and a control group of 56 patients who received some other anesthetic agent were studied. The most satisfactory tests for hepatic function were used and results were compared. No instances of "delayed chloroform poisoning" occurred in the series of 121 patients. Operative procedures were extensive and time of anesthesia was prolonged. The majority of the patients were considered to be poor surgical risks. Technics in both series were similar. Abnormal values for hepatic function were recorded slightly more frequently among those who received chloroform than among those in the control group. Abnormal results observed postoperatively were transitory; they usually occurred within a few days after operation and disappeared by the tenth postoperative day. Clinical evidence of a hepatic disturbance in this study was limited to moderate icterus.

The authors also present a study of the effect of chloroform on renal function. Chloroform was administered to 40 patients, and 40 others received a general anesthetic agent of some other type. By all the various tests there were no significant differences between the two groups in postoperative renal function.

As for the effect of chloroform on the cardiovascular system, results indicate the ever-present possibility of causing either reflex or direct myocardial depression which may progress very rapidly to cardiac arrest. No evidence of any marked tendency toward ventricular fibrillation was obtained, although ventricular tachycardia occurred in almost half the administrations. There was no "gradual and continuous decline in blood pressure," and the agent could be used for periods of much longer than one hour. Overdose could cause cardiac arrest. Prompt removal of the agent, plus artificial ventilation of the lungs with oxygen, then restored the patient. In the experience of the authors, once anesthesia has been established with cholorform, the degree of muscular relaxation in the first and second surgical planes is distinctly more satisfactory than at similar levels produced by other agents. Ability to maintain minimal effective concentrations of vapor is essential and, with equipment now available, difficult. There is evidence that enrichment of the anesthetic atmosphere with oxygen is beneficial to the cardiovascular system exposed to chloroform. Statistical evaluation of 1,111 records shows that the return of reflexes was more pronounced among patients who received chloroform than among patients in the control group. In patients of like physical status, there were no significant differences in the incidence of postoperative complications as among those anesthetized with chloroform and those who received other anesthetic agents. The concentration of chloroform in the respired atmosphere and in the blood during clinical anesthesia was determined by extracting the chloroform with diethyl ether.

The final conclusion of the authors is that chloroform does not deserve to be abandoned as a surgical anesthetic agent. However, its relatively nonirritant effects (as compared with ethyl ether) upon the reflexes, which inhibit breathing and prevent the inhalation of sudden high concentrations, put it in a class with cyclopropane, meaning that the responsibility for overdosage rests entirely upon the administrator. The patient is unlikely to protect himself by refusing to inhale an improper mixture of the chloroform, as he may do if ether is used.

This fine contribution to the subject of chloroform is in a class by itself. J.S.L.

American College Health Association News

Do you and your staff expect to attend the annual meeting of the Association? The time is May 1-3, and the place is the Copley Plaza Hotel in Boston. The program committee, with Dr. Thomas V. Urmy of Williams College as chairman, is preparing a most interesting program. "Widening Horizons in Student Health Work" has been adopted as the theme of the meeting.

* * *

Three institutions have been approved by the Executive Committee for membership in the Association. The membership will formally vote on these institutions at the annual meeting. The institutions are:

Merrimack College, Andover, Massachusetts, a denominational college founded in 1947. It has an enrollment of approximately 500 undergraduate students. John J. Lorentz, M.D. is the part-time director of student health. He received his degree from Georgetown University in 1947. Mary J. O'Connor, R.N., is employed full time. The president is Rev. Vincent A. McQuade.

Springfield College, Springfield, Massachusetts, an independent professional school accredited by the American Association of Colleges for Teacher Education. Three part-time physicians and two part-time nurses serve 1,100 men and women students. Erastus W. Pennock is director of the health service and Elena M. Sliepcevich is chairman of the health services committee. Paul W. Limbert is the president of the College.

St. John's University, Brooklyn, New York, a denominational institution accredited by the Middle States Association of Colleges and Secondary Schools. The institution has an enrollment of 6,750 graduate and undergraduate students. Marie Gibbons, R.N., is the authorized department representative to the American College Health Association. The two physicians are employed on a part-time basis. Rev. John A. Flynn is the president.

* * *

New directors of the Student Health Service have been appointed as follows:

James Cope, M.D., director of student health service at Stephens College, Missouri, has replaced H. M. Hardwicke, M.D., who was recalled to Service.

Professor Eleanor D. Kilcoyne, department of health and physical education, Brooklyn College, Brooklyn, New York, has replaced Sally E. Kutz, who is retiring.

R. J. Chamberlain, M.D., at West Virginia Wesleyan.

M. P. Wright, M.D., at the University of Montana.

* * *

The mid-atlantic section of the American College Health Association met at Keller Hall, Westhampton College (the women's branch), University of Richmond, Richmond, Virginia, on December 7, 1951. Dr. Frank R. Smith, Jr., Johns Hopkins University, the Section president, presided. Thirteen persons, representing nine colleges and universities, attended the meeting. Dr. Smith gives the following summary of the meeting: "The president's address consisted of remarks upon the practical value resulting from routine physical examinations and also an enumeration of the deterring factors.

"Dr. Peter N. Pastore, professor of otolaryngology, Medical College of Virginia, gave an excellent presentation on the diseases of the respiratory tract commonly seen in college students, with considerable discussion of the common cold. He advocated simplicity in treatment and warned of the harmful effect of the over-use of nose-drops which would produce too great drying of the mucous membranes and change in the rhythm of the cilia. He recommended aspirin or the coal tar derivatives, if not abused and used to excess, as the mainstay of treatment. He warned against the indiscriminate use of antibiotics and antihistaminics.

"Dr. Robby D. Bates, Jr., internist, Richmond, Virginia, enumerated a number of problems which are encountered by the college health physician. He discussed syncope without evidence of heart disease and attributed this to a sensitive carotid sinus. In regard to systolic murmurs he advocated ultilization of Levine's classification and suggested that all individuals with those beyond grade II be advised not to participate in college sports. He recommended individual consideration on those with grade I and II systolic murmurs. Diastolic murmurs he believes always mean organic heart disease and should as a rule be barred from competitive sports. He recognized the great difficulties in evaluating the significance of systolic murmurs.

"Dr. Thomas W. Green, Johns Hopkins University, presented an excellent summary of the newer drugs in the treatment of anemia and leukemia. For secondary anemia he recommended iron. For pernicious anemia he brought out the great advantage of vitamin B_{12} over liver or other therapy previously used. He touched upon the use of x-ray therapy and the nitrogen mustards in causing remissions of the leukemias.

"Dr. Richard Fowlkes, Jr., Professor of Dermatology, Medical College of Virginia, used lantern slides to demonstrate the more common skin diseases encountered in college students. He outlined his treatment of acne vulgaris, seborrhœic dermatitis, dandruff and fungus infections, especially of the feet. He spoke of the number of preparations available for the treatment of athlete's foot which indicated the unsatisfactory nature of its treatment. Whitfield's ointment, the old stand-by, in whole or half strength, is as satisfactory as any if rubbed off shortly after being applied twice daily.

"The officers elected were: Dr. Andrew D. Hart, University of Virginia, president; Dr. Cullen Pitt, University of Richmond, vice-president; Dr. Frank R. Smith, Jr., Johns Hopkins University, secretary-treasurer.

"The invitation of Gallaudet College, Washington, D.C., presented by Miss Mary C. Van Pelt, R.N., director of health, to act as host for the next sectional meeting was accepted. The meeting will be held about December 4, 1953.

"The section members went on record as favoring biennial meetings for the section. Ideally it would favor national meetings biennially so that sectional and national meetings could be held on alternate years.

"In view of the work now being done by Dr. S. I. Fuenning, University of Nebraska, of the Committee on Local Sections of the ACHA, it was decided not to formally request the transfer of the colleges in West Virginia to the Ohio section which would be more convenient to them. The questionnaire made out by Dr. Nesbitt and continued by Dr. Fuenning was distributed to those attending the meeting. Copies will be sent to the other members of the section."

* * *

The New England Section of the American College Health Association held its annual meeting at Mt. Holyoke College on December 8, 1951. After some preliminary remarks by Dr. Pattie J. Groves, chairman of hygiene at Mt. Holyoke College, a short business session was held, and Dr. John P. Monks of Harvard University was elected to succeed Dr. Thomas V. Urmy of Williams College as chairman of the New England Section during 1952.

Dr. John E. Sawhill, President of the National Association, described some of the plans for the national meeting in Boston next May.

Thirty-six persons representing 21 institutions attended the meeting.

* * *

EMPLOYMENT in a college preventive dental health education program is desired by Martha V. Stephens, 207 So. Berendo, Los Angeles, California. Mrs. Stephens has had experience in a dental consultation program and in dental statistics.

* * *

CALIFORNIA STATE Polytechnic College, San Luis Obispo, California, has been accepted for membership by the Executive Committee. Final approval of membership will be by a vote of the representatives of institutions at the annual meeting in May 1952 at Boston. California State Polytechnic College has an enrollment of 2,070 men and is accredited by the Northwest Association of Secondary and Higher Schools, Western College Association, and the State Board of Education.

* * *

A PHYSICIAN who has had four years' experience in student health work is seeking a position in an eastern or southeastern college at the expiration of his present contract in July. Please write to the Secretary-Treasurer, Edith M. Lindsay, School of Public Health, University of California, Berkeley 4, California, for further information.

Notices . . .

UNIVERSITY OF MINNESOTA CONTINUATION COURSES

A course in *Dermatology* for General Physicians will be held February 28 to March 1. The course is intended primarily for general practitioners, but will also be of interest to internists and pediatricians. Visiting faculty member will be Dr. Arthur C. Curtis, professor and chairman, department of dermatology and syphilology, University of Michigan.

A course in *Therapeutics* for general physicians will be held March 24 to 26. Among subjects to be discussed are treatment of certain gastro-intestinal conditions, treatment of certain hosuehold poisons, and management of acute and chronic alcoholism. Dr. E. H. Rynearson of the Mayo Foundation will serve as a visiting faculty member.

A course in *Surgery* will be held April 7 to 9, and will be concerned primarily, but not exclusively, with pediatric surgery. Guest speaker will be Dr. Robert Gross, Harvard Medical School and surgeon-in-chief of the Children's Hospital, Boston. The course will be under the direction of Dr. O. H. Wangensteen, head of the department of surgery.

A course in *Proctology* will be held April 14 to 19. All aspects of anorectal disease will be covered, and two half days will be devoted to operative clinics. Visiting faculty member will be Dr. Garnet W. Ault, professor, department of proctology, Georgetown University.

The eighth biennial continuation course in *Otolaryngology* will be held June 23 to 27, under the direction of Dr. Lawrence R. Boies and associates of the University of Minnesota medical school.

News Briefs . . .

North Dakota

ELEVEN LICENSES to practice medicine in North Dakota were granted by the medical examiners at Grand Forks on January 5. Those receiving licenses and intended place of practice include: Wilbur R. Koons of Grand Forks, Grand Forks; Carl H. Calman, Grand Forks; James S. Cole of Indiana, Grand Forks; Jack W. Revere of Kansas, Grand Forks; Wallace Nelson of Minneapolis, Grand Forks; Joseph L. Kushnir of Valley City, Wimbledon; Burton Olson, Minot; Anthony J. Lund of Leeds, undecided; Harold Kuplis of Bismarck, Turtle Lake; Lawrence O. Pearson of Erskine, Minnesota, undecided; and Edward N. Hathaway of California, Fargo.

Members of the board include Dr. D. J. Halliday, Kenmare, president; Dr. C. J. Glaspell, Grafton, secretary; John Fawcett, Devils Lake; R. B. Radl, Bismarck; O. A. Sedlak, Fargo; Joseph Sorkness, Jamestown; A. E. Spear, Dickinson; F. E. Weed, Park River; and W. A. Wright, Williston.

* * *

FULL ACCREDITATION has been given to the University of North Dakota school of medicine from the American Medical Association. Notification came from Dr. Donald G. Anerson, secretary of the association's council on medical education and hospitals. The school received a vote of accreditation on October 30 by the Association of American Medical Colleges.

* * *

A NEW quarterly publication, the *Medical Center Review*, sponsored by the University of North Dakota medical center, will be issued soon. The review will deal with the activities of the state medical center, the University school of medicine and the medical center advisory committee. Dean W. F. Potter is directing the publication.

* * *

STOCKPILING of medical and hospital supplies in the civil defense setup was discussed at the January 16 conference of the state civil defense council. Present at the meeting were Carl Gabel, regional director of the civil defense administration, Brig. Gen. H. L. Edwards, Dr. R. O. Saxvik, state health officer, and members of the medical committee of the council.

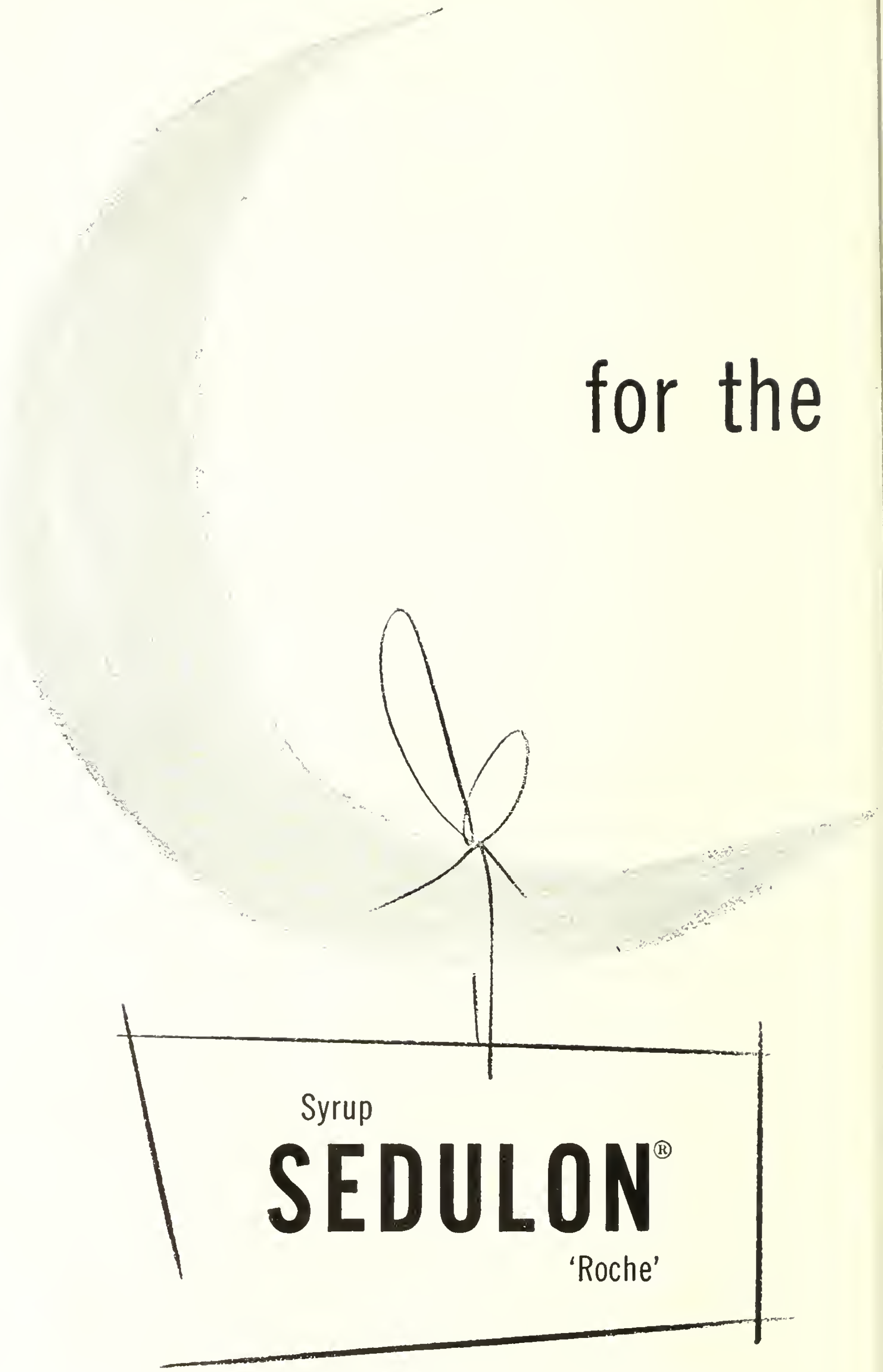
* * *

DR. R. D. CAMPBELL, who retired in 1947 after 27 years as chief of staff of St. Michael's hospital, Grand Forks, was honored on his 85th birthday on January 10, at the annual hospital staff dinner.

* * *

DR. MILTON BERG, Bismarck, was elected president of the Sixth District medical society at a recent meeting.

(Continued on page 118)



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NEWS BRIEFS—(Continued from page 115)

Dr. E. G. Vinje, Hazen, is the new vice president, and Dr. C. H. Peters of Bismarck, secretary. Dr. M. S. Jacobson of Elgin was elected as representative to the North Dakota State Medical association. Dr. Berg was also honored by election to the office of second vice president of the Radiological Society of North America at its Chicago meeting.

* * *

Dr. Ralph E. Dyson, Minot pediatrician, who has been associated with the Northwest Clinic in Minot since 1935, is establishing a new practice with his brother in Des Moines, Iowa.

Minnesota

Six new consultants have been named to the staff of the Mayo Clinic in Rochester. They are Dr. John C. Lillie, Dr. W. D. Anderson, Dr. James H. DeWeerd, Dr. Edward M. Litin, Dr. Harold H. Sendamore, and Dr. James H. Soule.

* * *

Dr. Spencer F. Brown, head of the department of pediatrics at Minneapolis General hospital, was awarded a scholarship for advanced study in cerebral palsy by the National Society for Crippled Children and Adults. He will study this summer with Dr. M. A. Perlstein, chief of the children's neurology clinic, Cook county hospital.

* * *

Dr. Gaylord W. Anderson, director of the University of Minnesota's school of public health, has been appointed to the board of editors of the new *Public Health Reports*. The magazine, first issue of which appeared in January, is an expanded version of the weekly technical journal of the same name published since 1878.

* * *

Dr. J. Arthur Myers, professor of preventive medicine and public health at the University of Minnesota, and chairman of The Journal-Lancet board of editors, has been awarded a $7,500 grant by the Minnesota Public Health Association to compile records on Minnesota's tuberculosis program. The grant, known as the H. Longstreet Taylor Research Fund, will be awarded annually for at least three years.

* * *

Victor Cohn, science writer for the *Minneapolis Tribune*, was the recent winner of one of two $1000 George Westinghouse science awards for 1950. Mr. Cohn's award was for a series of fifteen stories on problems and opportunities of old age. Presentation was made at the meeting of the AAAS in Philadelphia in December.

* * *

Dr. Owen H. Wangensteen, chief of the University of Minnesota's department of surgery, has been elected president of the Minnesota Academy of Medicine. New secretary of the organization is Dr. Wallace P. Ritchie, clinical assistant professor of neurosurgery.

* * *

Dr. Robert B. Engstrom of Mankato was elected president of the Blue Earth county medical society. Dr. John C. Mickelson of Mankato was named vice president and Dr. William S. Chalgren, secretary-treasurer.

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Dr. John F. Madden, St. Paul, was elected to the board of directors of the American Academy of Dermatology and Syphilology in Chicago.

° ° °

Dr. L. F. Johnston has been elected president of the Winona County Medical society.

PELVIC PAIN FROM THE POINT OF VIEW OF A GYNECOLOGIST—(Continued from page 66)

cologist, every effort must be made to alleviate the discomfort quickly and accurately. Technical skill as a surgeon is no longer the sole index of the capabilities of the gynecologic surgeon. Of greater importance are his diagnostic abilities and his judgment as to the best preoperative and postoperative care. Too often, a patient presenting pain as a symptom is subjected to an unnecessary and sometimes major procedure without a thorough understanding of the basic physiology and pathology of the part involved. The results of a technically perfect operation may be completely nullified by an improper indication for such an operation, fostered by inadequate preoperative investigation.

Editor's Note. The discerning reader will note in this issue a new look on The Journal-Lancet editorial pages. This is due to the use of a new type face, known as Caledonia, rated as one of the most beautiful and legible of modern fonts.

Meet Our Contributors . . .

Thomas J. Dry, a graduate of the University of Capetown medical school, South Africa, in 1929, took his internship at Somerset Hospital in Capetown, is now professor of medicine with the Mayo Foundation and consultant in medicine at the Mayo Clinic.

★

Edward Arthur Banner was graduated from Loyola University school of medicine in 1941, is now consulting obstetrician and gynecologist at St. Mary's and Colonial hospitals in Rochester, and instructor in obstetrics and gynecology at the University of Minnesota. He is a F.A.C.S., a diplomate of the American Board of Obstetrics and Gynecology, a member of the Central Association of Obstetrics and Gynecology and the Minnesota Obstetrics and Gynecological Society.

★

Charles Donald Creevy, a graduate of the University of Minnesota medical school in 1927, is professor of surgery and chief of the division of urology at the University of Minnesota. He holds membership in N.C.A.U.A., Minnesota Surgical Society, Twin City Urological Society, Minneapolis Surgical Society, American Association of Genitourinary Surgeons, American Urology Association, and others. He is the author of more than 60 medical papers.

★

Ernest MacFarlane Hammes, Jr., was graduated from Harvard medical school in 1941, is clinical instructor in neurology at the University of Minnesota, serves on the staffs of Mounds Park, Ancker, Miller, St. Joseph's and other St. Paul hospitals.

(Continued on page 122)

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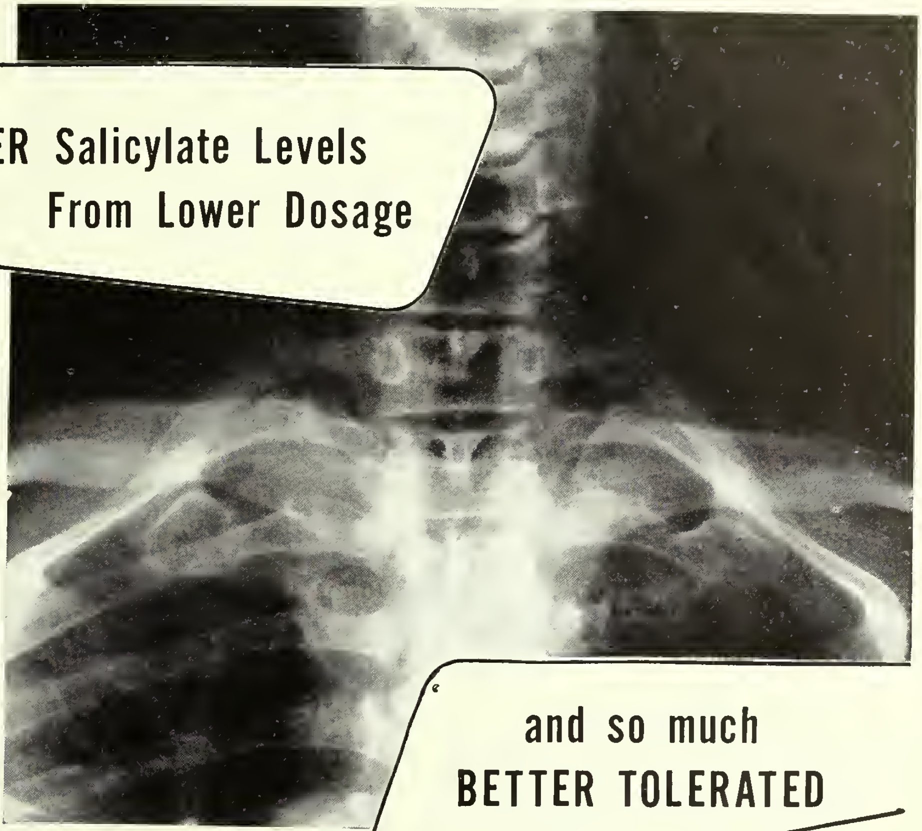

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MEET OUR CONTRIBUTORS

(Continued from page 120)

Bayard Taylor Horton, a graduate of the University of Virginia medical school in 1922, is now a consultant in medicine at the Mayo Clinic and St. Mary's hospital in Rochester. He is a fellow of A.M.A., A.C.P., A.C.A., and a member of the American Society for Clinical Investigation, Central Society for Clinical Research, N. Y. Academy of Sciences, Sigma Xi, Alpha Omega Alpha. He is the author of more than 170 medical articles.

★

Thomas E. Keys is a graduate of Beloit College and University of Chicago, graduate library school, is medical librarian at the Mayo Clinic. He is a member of the board of directors, Medical Library Association, American Association of the History of Medicine, History of Science Society. He is the author of *Cardiac Classics* and *History of Surgical Anesthesia.*

★

Ralph Thomas Knight was graduated from the University of Minnesota medical school in 1912, where he now serves as clinical professor and director of the division of anesthesiology. He is president-elect of the American Society of Anesthesiologists, past president of the Minnesota Society of Anesthesiologists, F.A.C.S., and a member of county and state medical societies and Minneapolis Surgical Society.

★

Lawrence C. Kolb, a graduate of Trinity College, Dublin, and Johns Hopkins medical school in 1934, is consultant in psychiatry at the Mayo Clinic, and associate professor in psychiatry at the Mayo Foundation.

★

Eugene Thomas Leddy, a graduate of Harvard medical school in 1919, is head of the section of therapeutic radiology at the Mayo Clinic and assistant professor of radiology at the Mayo Foundation. He is a member of A.M.A., Southern Minnesota Medical Association, American Roentgen Ray Society, Radiological Society of North America, American Radium Society, Sigma Xi.

★

John Silas Lundy, our guest editor, was graduated from Rush Medical College in 1920, is head of the section on anesthesiology of the Mayo Clinic and professor of anesthesiology of the Mayo Foundation. He is a diplomate and past president of the American Board of Anesthesiology; a fellow in anesthesiology and past president of the American Society of Anesthesiologists; secretary of the section on anesthesiology of A.M.A.; and holds membership in many scientific societies.

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(Continued from page 99)

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"Bilateral stellate ganglion injection with buffered Ammonium Sulfate solution is a simple, quick and effective method for relief of severe angina pectoris." The Journal of the American Medical Association. Vol. 144, No. 12, P. 1032.

The use of DOLAMIN in postoperative surgical wounds.

"When DOLAMIN is used to infiltrate surgical wounds at the time of closure, a minimal but definite decrease in the intensity of postoperative wound pain ensues, persisting through the second postoperative day in the majority of patients. There was no effect of the solution upon wound healing. . . . The effect was entirely sensory, no motor disturbances being noted. Not included in this series were five bilateral inguinal herniorrhaphy cases in which DOLAMIN was infiltrated on one side only. The intensity of pain in the DOLAMIN wound was less than that in the control wound in four of the five cases and was readily differentiated not only by the writers but also by the patient and the house and nursing staffs."—Herbert H. Davis and Carlyle E. Wilson. The American Journal of Surgery, Vol. LXXXI, No. 3, p. 318.

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THE ANALGESIC EFFECT OF
ROENTGEN RAYS—(Continued from page 57)

Metastatic spread of carcinoma in bone is best treated with high doses of "high voltage" roentgen rays, entirely unlike the lesions so far discussed. In certain instances, treatment with the appropriate hormones may be an adjunct to roentgen therapy.

The results of treatment of metastatic lesions of bone depend on the radiosensitivity of the primary tumor. Of the most common metastatic tumors of bone, it may be said that roentgen therapy is most satisfactory in the treatment of metastatic tumors which originate primarily in the thyroid gland. Next to these tumors, those which originate in the breast respond most satisfactorily. The results are least satisfactory in cases in which the primary tumor is situated in the prostate or suprarenal gland.

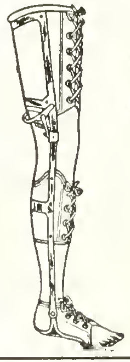
When roentgen therapy has failed, or has lost its previous effectiveness, the physician has little to fall back on to relieve his patient with the possible exception of an operation on the sensory nerves, or ever-increasing doses of morphine, or the like.

SUMMARY

Roentgen therapy is an effective method of alleviating pain due to a variety of causes. Although it is being displaced more and more by other methods of treatment, it still remains probably the method of choice in the treatment of several painful lesions.

ERRATUM

In the December 1951 issue, the second footnote to Dr. John S. Lundy's editorial "Venipuncture", on page 551 should read, "Subsidon falls into a third category of materials and should have been so labeled. It is another substitute unrelated to either the Expandex or P.V.P. It is Rutin in a solution similar to Ringer's solution."



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Management of Ocular Injuries*

JOHN P. WENDLAND, M.D.
Minneapolis, Minnesota

Whether we are ophthalmologists or general practitioners, we are all called upon to treat ocular injuries. In these time, with a possibility of an increase in all types of injuries, a discussion of ocular injuries is particularly appropriate. The subject will be presented from the standpoint of general practice, as in the rural communities it is usually the general practitioner who first sees the patient with an eye injury.

Lacerations of the Lids

Two factors make the handling of lid lacerations different from the handling of lacerations elsewhere. The first is the presence of a rich blood supply, and the second is the necessity for conserving all tissue possible from the cosmetic and functional standpoint. Extensive debridement in lid lacerations is not indicated, although adequate cleansing should be carried out. The rich blood supply often revives seemingly devitalized tissue, and at the same time minimizes greatly the danger of infection. Lid wounds rarely become infected. They may be sutured safely as long as 24 hours after injury although of course the earlier care is given, the better.

Wounds which do not involve the lid margins may be closed with 6-0 silk. Horizontal wounds leave practically no scar whereas vertical ones may leave a slight scar. Wounds involving the lid margins are more difficult to repair. The essential principle to remember in these is that the lid margin must be accurately coapted if an unsightly notching deformity with chronic tearing is to be avoided. The secret of adequate marginal coaptation is the use of an intramarginal suture of about 6-0 silk placed so as to include a bite of tarsal plate. Some advocate, in addition, resecting a small bit of skin so that the skin and tarsal plate closure do not directly overlie each other. I think that this is unnecessary surgery if careful attention is given to closing the tarsal plate and conjunctiva with one set of sutures and the skin with another.

If it is possible, sutures or knots should not lie exposed on the conjunctival surface, as they will abrade the cornea. Although the cornea tolerates one abrasion well, repeated abrasions from a suture are tolerated poorly. This means that the sutures closing the tarsal plate and conjunctiva as one layer must not go through the conjunctival surface. The knots may be buried in the lid. I prefer 4-0 or 6-0 plain gut for this suture. For closing the skin, 6-0 silk on a fine needle is preferable. Nothing larger than 4-0 silk or gut should ever be used on the lids and 6-0 silk is preferable in closing the skin of the lids. Interrupted sutures are desirable. A subcuticular stitch is unnecessary if 6-0 silk is used.

When the laceration involves the nasal portions of the lids, the possibility of severance of one or both lacrimal canaliculi must be considered. A check on the integrity of the lower canaliculus, functionally the most important of the two, is obtained by passing a number one Bowman probe down the punctum and distal portion of the canaliculus and noting whether it comes out in the wound or passes on into the nose. The upper canaliculus may be similarly checked. If the lower canaliculus is severed, accurate coaptation of the cut ends is desirable. One trick which may help in finding the proximal end of the severed canaliculus is to inject slowly a small amount of methylene blue into the intact canaliculus and watch for the appearance of a purple point in the incised tissue. Saline may be tried first, watching for the flow of fluid. Accurate coaptation is best obtained after the severed ends are located, not by sutures in the canaliculus proper, which is too small for sutures, but by passing a probe or gut first through the punctum and canaliculus, and then into the sac. The tissues are then sutured accurately around the probe and the probe or gut left in for six days. If patency of the lower canaliculus cannot be restored chronic tearing will result. Patency of the upper canaliculus is not necessary for adequate tear drainage.

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*Presented before the annual meeting of the North Dakota State Medical Association, Bismarck, North Dakota, May 21, 1951.

Foreign Bodies of the Cornea

Foreign bodies of the cornea are very common. I would urge all who handle them to become familiar with the use of a loupe as the foreign body is often small and easily overlooked. Also, the patient always refers the foreign body to the under surface of the upper lid as it is the scratching of this surface as he blinks which annoys him. Every patient complaining of something under his upper lid should have his cornea inspected carefully.

I prefer the following routine in dealing with corneal foreign bodies. The vision is checked first and two drops of 0.5 per cent Pontocaine solution 30 seconds apart are placed on the cornea. If the foreign body appears very superficial I direct a fine stream of saline against it from an irrigator. If this fails to dislodge it, I turn to the spud. I do not believe corneal foreign bodies should be wiped off the cornea with a cotton tipped applicator except in children, as failure to dislodge them only pushes them in deeper and damages adjacent corneal epithelium. A sharp pointed sterile spud should be used, the point placed under the foreign body, and the body lifted out of its pit in the cornea. It is desirable to remove rust rings in their entirety if possible as the cornea heals better if all foreign material is removed. The only exception to this is when the foreign body is situated directly over the pupil and the additional trauma necessary for complete removal may result in scarring sufficient to impair vision. Here no hard and fast rule can be given but occasionally it may be desirable to leave a portion of the rust ring. Following removal of the foreign body one should place in the eye 10 per cent Sodium Sulfacetamide ointment or an antibiotic ointment such as aureomycin ophthalmic ointment and apply a firm pressure dressing of two inch Elastoplast. The dressing must be firm enough to hold the lid shut over the cornea as blinking movements of the lid retard healing. A weak mydriatic such as 4 per cent homatropine is placed in the eye if there is considerable ciliary injection. If the foreign body has been superficial, I tell the patient to take the bandage off the following morning and return only if the eye does not feel right. If the body has been deeply embedded, and the area obviously will not be healed in 24 hours, the patient should return every 24 to 48 hours until healing takes place. No corneal foreign body should ever be treated as a trivial injury.

Abrasions of the Cornea

Abrasions of the cornea may be difficult to see and therefore fluorescein solution should be used to stain the area, to determine diagnosis and extent of abrasion. Denuded cornea of course becomes a bright green. Since ordinary fluorescein solutions provide a good culture medium for bacteria, I have used for some time a formula which is said to be bacteriostatic and which has been found to remain stable for long periods of time:

Fluorescein		.6 gm.
Sodium bicarbonate		.75 gm.
Aqueous merthiolate	1:3000	30 cc.

Fluorescein is not compatible with zephiran and likewise precipitates if the solution is not slightly alkaline.

Abrasions of the cornea are often very painful and a small amount of Butyn Metaphen ointment may be instilled. In addition Sodium Sulfacetamide ointment or an antibiotic ointment should also be placed in the eye and a firm pressure dressing applied. No abrasion should be left unbandaged. A dressing is much more important than the type of ointment placed in the eye. The dressing should be changed every 24 to 48 hours until the abrasion is healed. Infection of the abraded area, as evidenced by a dirty gray appearance of the area is sufficient reason for referral to an ophthalmologist.

Burns of the Eye

These may be classified as chemical or thermal. In all chemical burns the most important phase of treatment is early and prolonged washing of the eye with water or normal saline. Grant[1] advocates irrigation of the eye for a period of half an hour with normal saline. Immediate washing of the eye with the nearest tap water by the injured person is more important than all later treatment combined, however. For acid burns 2 per cent sodium bicarbonate solution may be instilled if desired and for alkali burns 0.5 per cent acetic acid solution. However, neither of these chemicals should be placed in the eye until thorough irrigation has been accomplished as the heat of neutralization may cause additional damage. Alkali burns in general are more severe than acid burns because alkalis dissolve the epithelium and mucoid of the corneal stroma, penetrating deeply, whereas acids cause coagulation of corneal proteins and do not destroy the mucoid. They are thereby limited in their penetrations. For these reasons also an alkali burn may not appear so severe immediately whereas an acid burn shows its full extent of damage very shortly by the white appearance of the precipitated corneal proteins.

Be cautious in your prognosis on an alkali burn for the first 24 hours. Graying of the endothelial face early after an alkali burn renders the prognosis more serious. Extensive debridement of the corneal epithelium has recently been advocated in corneal burns but unless there are actual visible particles of the chemical present I believe attempts at removal of the corneal epithelium are no better than adequate washing and actually may be harmful. If the burn is severe, atropine should be instilled and ointments used to prevent sticking together of conjunctival surfaces. A sulfacetamide or antibiotic ointment may be used. A firm dressing is applied. At subsequent dressings the cul-de-sacs should be exposed and ointment placed in the eye to aid in preventing symblepharon. Recently, the chemical hydrosulphosol in 5 per cent solution in castor oil has been used in the treatment of corneal burns. It provides the sulphhydryl radical (SH) which may be necessary in corneal healing. Those that advocate its use suggest that a few drops be either put in the eye once daily with the eye dressed between applications or that it be instilled every four hours. It would seem useless to put a firm pressure dressing on with the latter method. Seemingly severe chemical burns often make an amazing recovery even without the use of hydrosulphosol so the evaluation of its usefulness is difficult. At least one instance of severe allergic reaction to its use has been recently reported.[2]

Early grafting with mucous membrane, repeated late paracenteses, and artificial denudation of the corneal epithelium must be regarded yet as experimental therapy.[1] The effect of cortisone and related substances on the healing of corneal burns has not been investigated. Only in the case of lewisite do we have a specific chemical antidote in the form of BAL.

For the late scarring and vascularization of chemical burns of the cornea optical iridectomy or beta radiation may be indicated. Rarely corneal transplants may be used.

Thermal burns of the eye such as those from steam or explosions should be handled similarly to chemical burns except that no irrigation is necessary. Fortunately in flash burns of the face the cornea or conjunctiva are rarely involved as the lid reflex is so swift. The lids may be severely burned without corneal involvement. Hydrosulphosol has been advocated for these skin burns also. Skin grafting may be necessary to correct cicatricial ectropion resulting from these burns.

Radiation Lesions of the Eyes

Under radiation lesions of the eyes I would include any pathological lesions of the eyes, the result of energy from the electromagnetic spectrum. This spectrum includes all forms of radiation between the long radio and diathermy waves to the very short cosmic rays. Obviously it is impossible to discuss in detail the effects of the entire electromagnetic spectrum; only a few of the more commonly encountered lesions can be discussed.

Photophthalmia, the result of excessive ultraviolet radiation is seen frequently. It occurs most commonly in welders but may be seen in people who have remained out on the snow in bright sunlight with no protection to the eyes or in similar situations where the intensity of ultraviolet light is high. It is characterized by a latent period of some three to eight hours after which time there is a relatively sudden onset of pain, photophobia and blepharospasm. Gross examination of the eyes may reveal nothing abnormal but after staining with fluorescein and examining the cornea with the biomicroscope a multitude of minute staining dots may be observed. The condition is extremely painful and absence of marked objective findings should not be an excuse for an unsympathetic attitude. Due to the latent period people with this condition usually call at night. The condition is never serious from the standpoint of sequelae and clears in about 24 to 48 hours as suddenly as it has come. Treatment consists in the application of a suitable local anesthetic agent such as Butyn-Metaphen ophthalmic ointment. The ointment may be repeated every four hours during the first 24 hours. Although all local anesthetics in the eye retard healing the pain relief afforded by the ointment makes application of the ointment imperative. It is usually not necessary to bandage the eyes although in extremely severe cases this will afford additional relief. No tolerance to repeated exposure develops as is the case with the skin.

Solar retinitis ("camp eye", sun eclipse blindness) represents another effect of radiant energy on the eye. It is due, not to ultraviolet rays, but to the heat effects of visible and infrared radiation contained in the sun's rays. Less frequently it may be due to the carbon arc. In either case the patient must look directly at the source of light. The retina is affected through absorption of the radiant energy by the pigment epithelium with conversion to thermal energy resulting, this latter form of energy then actually burning the retina. There is no latent period. The macular region appears grayish soon after injury and eventually shows sharply demarcated pigmentary changes. Visual reduction may be of all degrees and temporary or permanent. The only therapy is prophylactic and consists in warning people about viewing eclipses of the sun without very dark glasses.

So-called glassblowers' cataract which is now rare is due to heat effects on the lens from infrared rays. It comes on only after repeated exposures over a long period of time. The only treatment is surgical removal of the cataract.

Roentgen rays may produce profound changes in the eye. Cataract is the complication most to be feared. The eye should not receive in a single dose more than one-third skin erythema dose. In repeated doses, the effects of x-ray on the lens are definitely cumulative and the eye should probably not receive a total of more than 300–500 roentgens (100–200 kilovolts). There is always a long latent period extending anywhere from six months to as long as eight or twelve years. Children's lenses are more susceptible than adults and there is considerable variation in susceptibility at all ages. Grenz rays and beta "rays" are largely absorbed by the cornea and probably are thus not cataractogenic simply because they do not reach the lens in sufficient quantity. Keratitis and glaucoma may be seen with heavier x-ray doses but damage to the retina is exceedingly rare. Xerosis from destruction of the mucous glands of the conjunctiva may result from x-ray. Vision is usually lost in this condition and little can be done to prevent visual loss. The therapy of roentgen damage to the eye is prophylactic: first, in avoiding the use of x-ray for minor conditions of the lids such as dermatitis and blepharitis, and, second, in protecting the eyeball with a lead shield when x-ray is absolutely necessary. Radium, although it takes somewhat higher doses, may also produce cataract as well as the other changes listed.

Gamma rays and neutrons are found in atomic bomb explosions and may produce cataract. Two per cent of the survivors within one kilometer of the hypocenter of the bombs dropped in Japan apparently developed radiation cataracts.[3] This amounted to about ten people. Cataract has been reported in cyclotron workers.

Contusions of the Eye

A contusion of the eye is a non-perforating wound of the eye caused by a blow or an explosion in which the fibrous tunic, the cornea and sclera, remains intact. The effects of contusions are many and varied. Many of the eyes show a subconjunctival hemorrhage as evidenced by a marked even redness of the eyeball without prominent tortuous vessels. The conjunctiva may be so edematous as to overhang the limbus. The lids have usually shared in the blow and may be swollen shut. Findings which tell us that damage has been sustained to the interior of the eye are: hyphema, eccentric non-reacting pupil, iridodialysis, tremulous iris, subluxation of the lens, Vossius ring, separation of ciliary muscle from the scleral spur, cataract, vitreous hemorrhage, choroidal rupture, commotio retinae, retinal detachment, hypotony or glaucoma, and rupture of lamina cribrosa and optic nerve.

Hyphema (hemorrhage into the anterior chamber) may be either mild or severe. When mild it is of very little consequence and absorbs readily. A fluid level of blood is seen in these milder cases. Caution must be used in administering mydriatics as cases have been reported in which glaucoma was precipitated. Moving the iris with a mydriatic may cause further bleeding. Watchful waiting, limiting the patient's activity, but not requiring bed rest is the therapy advised in the mild cases. Hyphema which completely fills the anterior chamber is a danger signal as it is often followed by serious complications such as glaucoma and blood staining of the cornea. The cornea in severe hyphema looks like an eight ball and the hemorrhage has been called eight ball hemorrhage. A rise in intraocular pressure is an indication for paracentesis and removal of as much blood as possible through irrigation. If the blood is not removed (and this may be difficult because of clotting) blood staining of the cornea will usually result. In blood staining of the cornea blood pigments find their way into the corneal stroma and remain long after the hyphema has absorbed leading to a grayish opacity, more dense centrally, which often destroys useful vision for a year or two and sometimes permanently. A hyphema filling the anterior chamber is indication for speedy referral to an ophthalmologist.

An eccentric or non-reacting pupil is an indication of damage to the sphincter of the iris. No treatment is required. Either full recovery, partial recovery or no recovery takes place spontaneously. If a traumatic iritis supervenes as evidenced by a muddy iris, soft eye and slight haziness of the aqueous (aqueous flare under the slit lamp) mydriatics are indicated. A persistent iritis is an indication for referral to an ophthalmologist.

An iridodialysis if not severe enough to interfere with vision is better left alone. Surgical repair may be done late if vision is interfered with. There is danger of a complicating glaucoma following repair of an iridodialysis, however.

A tremulous iris means a subluxated lens. The iris will be seen to jiggle slightly on movements of the globe. There is no treatment required for a tremulous iris and no immediate treatment necessary for a subluxated lens unless glaucoma supervenes in which case the lens must be extracted. A subluxated lens is always a serious complication of ocular contusion as extraction is usually accompanied by vitreous loss with a poor end result.

Separation of the ciliary muscle from the scleral spur results in marked intraocular bleeding and in retraction of the iris almost to the point of invisibility. The diagnosis of this injury may not be made until the hyphema absorbs, and the prognosis is poor because of the severe intraocular hemorrhage.

If the lens capsule is ruptured a cataract will develop within a few hours often accompanied by swelling of the lens and compression of the iris against the angle of the anterior chamber. This may result in glaucoma. A hard eye with a swollen lens is an indication for immediate removal of the lens. If the lens capsule is not ruptured a cataract following contusion will develop very slowly, often months or years later.

When the eye has suffered from an appreciable hemorrhage spreading through the vitreous an attempt to view the fundus with the ophthalmoscope gives one the feeling of looking into a coal bin in the dark. The patient should be kept quiet in bed and a careful search made, as the hemorrhage clears, for choroidal ruptures, commotio retinae or retinal detachment. Recovery from vitreous hemorrhage is exceedingly slow and may be complicated by the development of fibrous bands which may detach the retina. On the other hand, quite severe hemorrhages may clear surprisingly well with return of normal vision. The patient must be kept from discouragement unless other complications render recovery of vision unlikely. Any medicines given for the purpose of absorbing vitreous hemorrhage probably act as placebos.

A choroidal rupture appears as a whitish line in the fundus, usually in the neighborhood of the disc, with its concavity towards the disc. The rupture is accompanied by retinal and preretinal hemorrhage and for this reason is often not discernible until after the bleeding clears somewhat. Commotio retinae is a contrecoup injury of the retina, usually in the macular region, recognized by the presence of grayish edema of the macular area. Vision may be considerably reduced at onset. By the time two weeks have passed, the edema has usually subsided and the vision returned to normal. In severe cases, however, the edema is gradually replaced by pigmentary changes and vision may be permanently reduced.

A retinal detachment is a most serious complication of blunt injury to the eye. It is recognized in the full-blown case by the undulating, wavy, gray appearance to the affected area of the retina. In addition, the detached area is elevated, the retinal vessels appear darker than usual and there may be tears in the retina present. Many cases are not this well defined, however, some of the detachments being flat. A slight grayish color to the retina plus the dark vessels aids in the diagnosis. There are often other injuries such as vitreous hemorrhage, or retinal and preretinal hemorrhages which may obscure a retinal detachment in the immediate posttrauma period. For this reason it is probably advisable to require of those patients, who show retinal damage as evidenced by commotio retinae or vitreous or retinal hemorrhages, bed rest. The eye should be atropinized unless there are anterior segment contraindications. Watchful waiting while the patient is at rest in bed will help determine the extent of the retinal damage. Some traumatic elevations of the retina will subside on bed rest without requiring surgery; some will require surgery.

A rupture of the lamina cribrosa and optic nerve occurs usually with penetrating injuries of the orbit such as occur with shrapnel, shotgun pellets, knives and the like. It is accompanied by considerable hemorrhage in the region of the disc and is followed by an optic atrophy, usually with pronounced and permanent loss of vision. Bed rest is indicated until the hemorrhage begins to absorb.

Besides the "internal" ocular injuries from blunt blows to the eye we also often get corneal damage. Abrasions may occur but the most typical injury is that of striate keratitis. This is usually not serious but may impair the view of the deeper structures. It requires no treatment.

Patience on the part of both doctor and patient is required in the management of ocular contusions. If the contusion is severe, bed rest is important until the acute phase of hemorrhage and edema have subsided. If a retinal detachment is suspected both eyes should be bandaged. Atropine, one per cent, should be used where the posterior segment of the globe is primarily involved, but where there is anterior segment injury, especially hyphema, atropine should not be used but rather no mydriatics or at most homatropine hydrobromide four per cent. Where true iridocyclitis supervenes, evidenced by a gradual increasing severity of changes in the aqueous, treatment for iridocyclitis should of course be instituted. This includes mydriatics, foreign protein injections and possibly ACTH or cortisone.

Lacerations and Perforations of the Globe

Lacerations of the conjunctiva need only be cleansed with normal saline and sutured with 6-0 black silk. If small they require no suturing as the conjunctiva heals well. Conjunctival lacerations should be checked carefully to rule out injuries to the extraocular muscles or perforating injury of the globe. Lacerations of the extraocular muscles should be sutured carefully with 4-0 plain gut to restore normal muscle function.

Perforating injuries of the cornea or sclera are always serious, often serious enough to destroy the globe. Perforating injuries involving lens or ciliary body or in which vitreous is lost are most dangerous.

General treatment consists in antibiotic therapy and possibly sulfonamide administration, tetanus antitoxin, and fever therapy. Fever therapy should not be started, however, for approximately 48 hours after the wound has been taken care of. An initial dose of 10 million triple typhoid organisms for an adult is suggested with increasing dosage every 48 hours until five to six injections have been given. Old age and serious systemic disease are contraindications to fever therapy.

It is felt that any wound in which there is prolapse of the intraocular contents, or in which the anterior chamber is absent when first examined, or in which the lens appears to have been injuried, should be referred immediately for definitive care. It is important to remember that iris prolapse when a few hours old may not be as easy to recognize as might be imagined. The iris is a very delicate tissue and within a few hours after prolapse it loses its pigment and appears almost like fibrin in the wound. A distorted pupil with the iris rising to the wound should be regarded as an iris prolapse even though none is readily visible externally, until the exact extent of herniation into or through the corneal wound can be determined when the wound is repaired.

First aid should consist in, first, handling the eye with extreme gentleness. This is very important as squeezing on the part of the patient may further prolapse the intraocular contents, or cause a prolapse where there was none before. Secondly, atropine one per cent, and aureomycin drops (or antibiotics of similar spectrum) should be instilled in the eye and a firm pressure dressing applied. If available, an eye shield of stiff cardboard or aluminum may be placed over the dressing. The patient should be kept quiet, preferably at bed rest, while being transferred for definitive care. He should be cautioned strongly against stooping over, straining in any way, or squeezing his eye. Food and drink should be withheld as the patient sometimes becomes nauseated before or after repair of an ocular injury. If the patient is a child a general anesthetic will be necessary for repair.

Definitive local treatment consists in excision of any prolapsed parts and in suture of the laceration or in covering of the laceration with a conjunctival flap. There is some difference of opinion as to which method is the most desirable but either is certainly satisfactory. Local anesthesia consisting of facial nerve block, retrobulbar novocaine injection and 1 per cent Pontocaine drops should precede the actual surgical repair. Six-0 braided black silk with atraumatic needles is most satisfactory for suturing corneal lacerations. Interrupted sutures should be used. All sutures should be placed and the flap dissected before any of the prolapsed tissue is excised. If the lens capsule is grossly ruptured and the lens appears swollen it will have to be removed. However, opacity of the lens is not an indication for immediate removal. If possible, it is better to wait until the eye has quieted down before attempting removal of the cataract.

No prolapsed iris should be pushed back into the globe unless the case is treated within the first hour and even then the danger of infection is greater when this is done. Ciliary body or choroid when presenting simply between the lips of the wound should be held in and covered by properly placed sutures uniting the edges of the wound. Excision of ciliary body results in severe bleeding. Blood in the anterior chamber should be irrigated out as well as possible. Vitreous loss through an anterior laceration either at the time of injury or during surgical repair is a very serious complication. Very few of these eyes do well and many come to enucleation. Vitreous loss is suspected when the patient is first examined by the rather collapsed appearance of the globe and by the presence at times of a good anterior chamber in the face of an obvious gaping laceration. This indicates that vitreous has filled the anterior chamber. Air injected into the anterior chamber at completion of the repair of a corneal laceration by forcing the iris into proper position may help prevent anterior synechiae from forming.

In severe lacerations of the globe the decision whether to enucleate the eye or attempt to conserve it must be made. The only reason for immediate enucleation is an injury so extensive as to completely disorganize the globe. This means an injury with loss of much vitreous, often the extrusion of the lens and the prolapse of choroid or ciliary body. If there is any possibility of retaining any vision, enucleation should be delayed. With the passage of ten days after injury the safety period on sympathetic ophthalmia has expired, and if the globe is to be removed it should be removed without delay to rule out the risk of sympathetic ophthalmia. The decision on enucleation should always be left to the ophthalmologist. Presence of one or more of the following conditions adds weight to the decision to enucleate:

1. An extensive laceration of the cornea in the pupillary area with intraocular damage such as traumatic cataract or prolapse of uveal tissue
2. Persistent congestion of the eye with irritableness
3. Severe ciliary body injury
4. Purulent panophthalmitis
5. No light perception, plus an irritable eye—an absolute indication for removal
6. Extrusion of the lens with vitreous loss
7. Severe vitreous hemorrhage
8. Retinal detachment
9. Normal opposite eye

Sixty-three per cent of the cases of sympathetic ophthalmia are due to penetrating injuries of the globe.[4] Cortisone and ACTH offer some promise but should not influence us as yet in our decision concerning enucleation.

Treatment of perforating injury to the globe falls roughly into three periods. During the first period, which ends arbitrarily at 24 hours, everything that is surgically possible is done to conserve the eye. The second period is one of watchful waiting in which general treatment, such as fever therapy and antibiotics, is administered. During the third period, beginning at the end of ten days, consideration is given to enucleation or conservation of the eye.

Intraocular Foreign Bodies

Although visual safety programs have reduced the number of intraocular foreign bodies, they still constitute one of the most common of serious eye injuries. Such a body is often unsuspected by examiner and patient. The patient may have felt a momentary sting while working on metal but may notice little effect on his vision, his only symptom being one of slight pain in the eye or the sensation of a foreign body. When the examiner finds nothing under the lids or on the cornea he may be inclined to dismiss the patient. Examination with the biomicroscope is very valuable in these cases, and so is the history. Inquire carefully into the history of the injury. If the patient has been working at a task in which it is possible for a small, sharp particle to fly off at high speed, make an x-ray examination of the eye without delay. With the biomicroscope, or even with the loupe, a small penetrating track can be seen, usually in the cornea. In addition, there is the telltale mark of a penetrating injury of the cornea, corneal epithelial edema and often striate keratitis. There are a few cells floating in the aqueous, a faint ray, and miosis. There may be a hole in the iris. The foreign body, depending upon its location, may or may not be seen with the ophthalmoscope, and there may or may not be aqueous or vitreous bleeding.

Where large foreign bodies have penetrated the globe the diagnosis is easy.

Management of an intraocular foreign body consists in confirmation of the foreign body with x-ray and administration of tetanus antitoxin.

If the patient must be transported some distance for removal of the foreign body, atropine should be placed in the eye and the eye bandaged. The patient should be kept as quiet as possible with no lifting, stooping or straining. Both antibiotics and sulfadiazine are indicated and should be started promptly. No attempt should be made to remove the foreign body until accurate localizing films are made.

The feasibility of removal depends primarily upon whether or not it is magnetic. If magnetic, there are two main routes of removal. One is the anterior route in which the foreign body is pulled around the lens and removed through an incision at the limbus. The other is the posterior route in which the foreign body is removed through an incision in the sclera, either over the pars plana, or directly over the site of the foreign body. It is felt that when the lens is damaged, and the foreign body is not over two millimeters in size the anterior route extraction may be tried. However, when a body is large or the lens undamaged, the posterior route is preferred.

If the foreign body is in the vitreous an incision in the pars plana is indicated. If it lies in the retina and has already damaged the latter, removal with an incision directly over the foreign body is preferable, preceded by ringing the site with diathermy punctures. Sutures are also preplaced so that they may be pulled taut immediately upon removal of the foreign body. The weakest current which will remove the foreign body is desirable. Retinal detachment is unfortunately one of the late complications of foreign bodies in the posterior segment and the prognosis in all intraocular foreign bodies should be guarded for this reason, even though the immediate results seem good. Following removal of the body, a course of triple typhoid should be given, beginning with 10 million organisms and increasing the dosage with respect to fever obtained. A total of 4 to 6 injections is usually indicated. If for any reason delay in removal is necessary foreign protein therapy should be instituted prior to removal.

The prognosis in non-magnetic intraocular foreign bodies depends upon the size and composition of the material. Glass is well tolerated and should probably be left alone. Any body containing copper is poorly tolerated and prognosis poor. Many of the copper foreign bodies that are seen are due to dynamite cap explosions and are often binocular. If the foreign body is uniocular and the other eye normal decision must be made as to whether the foreign body should be left alone, an attempt made to remove it, or the eye enucleated.

Consultation is desirable in these cases. Generally speaking, removal of non-magnetic foreign bodies from the posterior segment of the globe is very unsatisfactory.

SUMMARY

The importance of prompt recognition and treatment of ocular injuries is emphasized. As the eye is a small organ it is often overlooked in the face of what seem to be more dominant injuries elsewhere in the body. Careful, gentle, early examination of the eyes should be done even though injuries are present elsewhere in the body.

Appropriate measures are discussed for various ocular injuries. No ocular injury should be considered trivial.

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Thus, one person cannot inhale the smallest particle of powdered ipecacuanha, another cannot inspire the exhalations from certain animals, another the perfume of certain flowers, and still another cannot breathe the air in a particular locality without suffering from attacks of asthma; whereas, either of these individuals may, in all other conditions, be quite free from such attacks. Hence, we see how futile must be all medical treatment so long as the subject is exposed to the continued action of the exciting cause.

J. W. Finch: Review of Dr. Boardman's case of "nocturnal periodic cough."
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Radiation Reaction in Small Bowel

A Case Report

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Radiation therapy is employed frequently in the treatment of carcinoma of the cervix and corpus of uterus. Much has been written concerning the curative effect of irradiation, and also of the palliation of this treatment in late cases of carcinoma in this region. Few reports are found in literature of untoward effects on adjacent abdominal organs, especially the small intestine. Because of the relative rarity of chronic radiation changes in the small bowel,[1] this report of a case showing such changes six years after initial roentgen therapy was thought worthy of presentation.

CASE REPORT

Mrs. C. A., a 69 year old white female, was admitted to Sacred Heart Hospital on September 16, 1950. The complaints on admission were vomiting, pain in the abdomen and distention of one day duration and chronic diarrhea for six years. She gave a history of cancer of the cervix discovered in January 1944. The pathological diagnosis at that time was carcinoma of the cervix, grade IV. She was treated by x-ray from January 28, 1944 to March 7, 1944 with a dosage of 8400 *r*. Using ten radium insertions she was given a total of 6600 mg. hours between February 8, 1944 and March 14, 1944. Starting on December 16, 1944 she was given four treatments of deep x-ray to the dorsal spine, totaling 600 *r*. This last treatment was given for osteoarthritis.

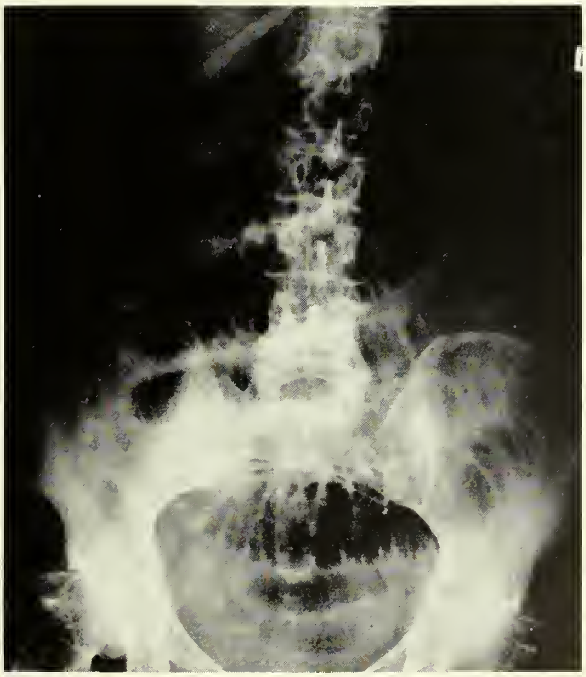

Fig. 1. Flat plate of abdomen, on admission, showing small bowel obstruction.

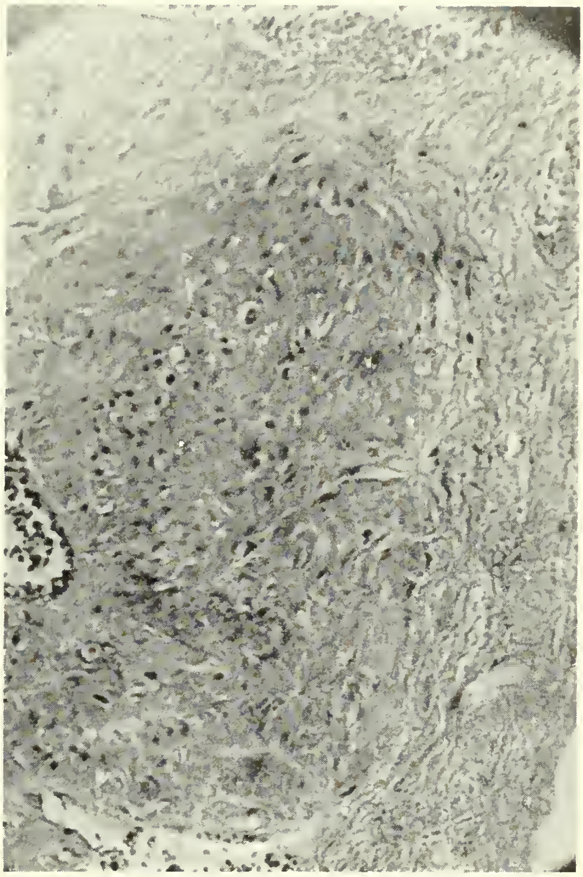

Fig. 2. Magnification 200 x, showing thickening of serosa, fibrosis, telangiectatic veins and endothelial giant cells.

A flat plate of the abdomen (figure 1) made on admission to the hospital showed evidence of small bowel obstruction. The laboratory work was not remarkable. A preoperative diagnosis of small bowel obstruction, cause undetermined, was made. This patient was taken to surgery on September 17, 1950. A stricture of the small bowel ten centimeters proximal to the ileocecal valve was found. The distal 50 cm. of small bowel was thick walled, telangiectatic and appeared edematous, and was not distensible. As one examined the bowel proximally it appeared more normal and became markedly distended. The distal 50 cm. of small bowel was resected and an end-to-end anastomosis was done. The patient convalesced satisfactorily and was discharged on September 28, 1950. Following this surgery the patient had marked relief of her chronic diarrhea.

The pathologist's gross report showed a thick walled piece of small bowel with a stricture at one point and ulceration at the point of stricture. Microscopic report showed marked fibrous thickening of the wall in all portions as shown in figure 2. There was no inflammatory reaction except at the point of ulceration as shown in figure 3. In the absence of inflammatory changes in the bowel it was the pathologist's impression that the stenosis and fibrosis were due to irradiation.

COMMENT

Experimental work by Des Jardins[2] on animals shows the sensitivity of the small intestine to radiation is greater than the stomach or colon. The duodenum and jejunum are the most sensitive portions of the small bowel. Friedman and Warren[3] list the sequence of events following irradiation as initial epithelial reaction, atrophy, regeneration and residual consisting mainly of telangiectatic changes. They found edema of the connective tissue present during the first three months, becoming hyalinized after three months. By the end of six months the submucosa especially was thickened and hyalinized.

The absorptive behavior of the intestine following irradiation shows pronounced alterations.[4] Marked decrease in absorption of dextrose, fructose and mannose by the small bowel in irradiated state has been described. Alteration and impairment of the fat absorption and alteration of the appearance of the intracellular fat droplet in the intestinal epithelium has been described. The impaired absorption of sugar and fat probably account for the diarrhea which sometimes follows irradiation.

CONCLUSION

1. A case of x-ray reaction of the bowel of six years duration with chronic diarrhea and finally ulceration and stricture is reported.

2. Whenever x-ray therapy is given to an organ in the region of the small bowel one should be aware of the effects of x-ray on the small bowel.

3. Irradiation reaction in the small bowel is characterized by stenosis, fibrosis, telangiectasis and in this case by ulceration.

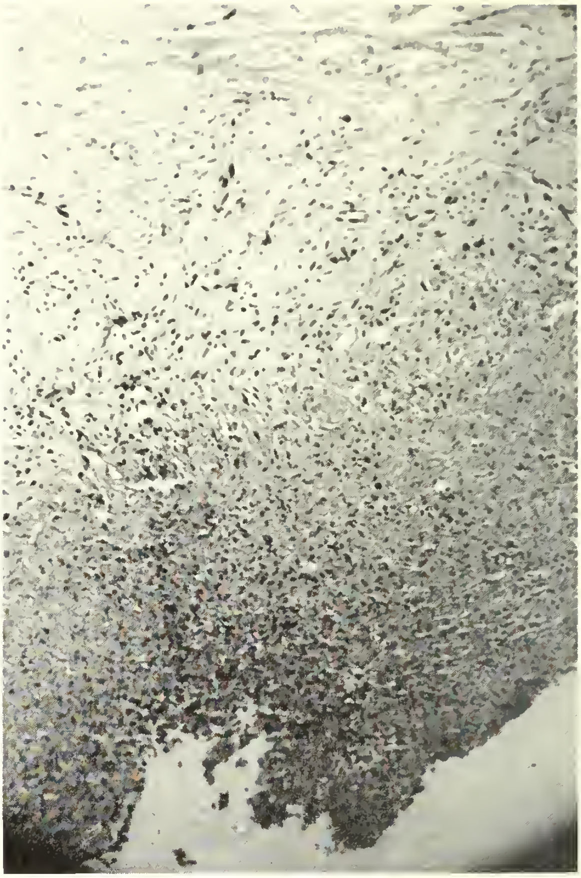

Fig. 3. Magnification 100 x. Ulcer at point of stricture, showing inflammation of mucosa and submucosa and fibrosis of muscularis.

4. The author does not feel the fear of producing the above changes should deter the radiologist from administering proper dosages when treating cancer.

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The Antihistamines, Cortisone and ACTH in Respiratory Allergy

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Of the large series of drugs which have been submitted to the allergist for experimental and clinical study during the past two decades, none have exceeded in interest and importance the antihistamines, and more recently, the hormones, cortisone and ACTH.

The value and the limitations of the present group of antihistamines in allergic disease has been fairly well delineated. The introduction of cortisone and ACTH, however, has been so recent, and the supplies for investigation so limited, that it is too early to fully assess their value in allergic conditions. That both cortisone and ACTH do have a suppressing or blocking effect on allergic disease and certain other immune reactions has been demonstrated and confirmed by many observers.

Certain topics have been selected, from the broad field of the antihistamines and hormones in relation to respiratory allergy, which it is hoped will be of practical clinical interest.

THE ANTIHISTAMINES

Histamine is present normally in many tissues of the body. It was Dale's theory,[1] expressed in 1929, that as a result of injury to the cell, owing to an intracellular reaction of an antigen with an antibody, histamine was released from the cell during anaphylaxis. This release of histamine from the cells produced a reaction similar to that which occurs after the simple injection of histamine into the animal. It is now generally accepted that the release of histamine also plays an important role in human allergy as well as in anaphylaxis. As histamine or histamine-like substances became more and more accepted as an important factor in anaphylaxis and allergy, a continuing search was made for histamine antagonists, or inhibiting agents. Many were found, although most were too ineffective for clinical use and others were too toxic for use either in animals or man.

When it was demonstrated in 1945 and 1946 that Benadryl and Pyribenzamine had definite antihistaminic properties, and that they could be safely administered with striking benefit in certain allergic conditions, intensive chemical, pharmacologic and clinical studies followed which have led to the introduction in the past five years of many additional antihistamines of proved clinical value. In fact there are so many antihistamines on the market that a patient could probably be given a different antihistaminic compound daily for two months without duplicating the same medication. There are so many good antihistamines that it is now impractical for any clinician to use them all. It is an advantage, however, to have a good choice of antihistamines because their effectiveness varies and the tolerance of patients differs. If intolerances or distressing side effects develop after the use of one type, it is easy to try other equally effective antihistamines of another type. Also, as Stoesser[2] pointed out, some antihistamines appear to be more effective in the treatment of certain allergic syndromes than in others. It is better therefore to use a few antihistamines often and become familiar with their effectiveness and relative toxicities, than it is to be switching about among all the available antihistamines. There is now no need for the introduction of more new antihistamines unless they are definitely less toxic than the present group, or unless they are more effective and have more prolonged action.

Antihistamines will satisfactorily control the symptoms of approximately 60 to 75 per cent of hay fever sufferers according to the experience of different observers. When the symptoms of hay fever are relatively mild, as in the tree and grass pollen seasons, antihistamines are particularly effective and frequently supplant any other treatment. If only mild hay fever occurs during the fall weed season, antihistamines should be given a good trial; however, if the symptoms are

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fairly severe or if they are complicated by asthma, we advise hyposensitization which may then be supplemented by antihistamines for additional symptomatic relief and protection.

In vasomotor rhinitis, or perennial allergic rhinitis, the percentage of relief is not quite as high as in seasonal pollinosis; about 50 to 70 per cent of the patients find antihistamines are effective remedies. Nasal polyps are rarely affected by antihistamines.

Antihistamines are least effective in relieving asthma; only about 20 to 30 per cent of such patients obtain effective relief. If it is remembered that asthma is a syndrome of many causes, and that cases of uncomplicated allergic asthma are in the minority, it is then easier to understand why antihistamines have not been particularly effective in treating asthma. Allergic asthma, uncomplicated by infections and in a relatively mild state, can be treated with antihistamines with frequent success. Feinberg and associates[3] stated that the allergic cough which precedes some attacks of asthma, especially among children, is at times effectively controlled by antihistamines. The sooner an antihistamine is administered after exposure to the allergen which produces asthma, the easier it will be to suppress the reaction in the bronchi.

Intrinsic asthma, asthmatic bronchitis and emphysema are not dependent on histamine for their presence, and, therefore, should not be expected to respond to antihistamine therapy, and, in fact, they do not.

Since antihistamines have a blocking effect only on the allergic reaction, and since the symptomatic relief resulting from their use usually disappears in three to eighteen hours, the need for a thorough allergic investigation in each case is evident. The all-important goal in treating any allergy is to discover the responsible allergen or allergens, and avoid or remove them from the patient's environment if at all possible. If it can be determined, for example, that a housewife has a nasal allergy due to sensitivity to a wave-set material which she uses on her hair, it is better then to dispense with that particular wave-setting agent than to try to keep the nose open and comfortable with antihistamines. Likewise, if a child experiences asthma from a cat the parents should get rid of the cat, and should administer antihistamines for relief only when the child inadvertently encounters a cat.

Antihistamines do not perform well when an allergic condition is complicated by a superimposed secondary infection. The patient who has an allergic nose that has become infected or has an associated sinusitis will not be helped by antihistamines as a rule.

Much information of interest and importance to the subject of antihistamines is available. For those who wish to pursue the subject further let me commend the new monograph *The Antihistamines: Their Clinical Applications* by Feinberg, Malkiel and Feinberg.[3]

CORTISONE AND ACTH

The prompt relief of symptoms after the administration of either cortisone or ACTH to patients with a variety of allergic conditions has been amply demonstrated and confirmed. Usually after one to seven days of adequate treatment, allergic symptoms subside or disappear, but they may recur promptly or within weeks or months after discontinuance of use of the drugs. This has resulted either in attempts to find a small maintenance dose of these drugs for such patients, or in the use of a series of repeat courses of the hormones whenever symptoms recur.

The situation is different in treating hay fever (pollinosis), however, because this disease is limited to the season of pollination which lasts only a few weeks in most instances and the disease is then over until the next year. Both ACTH and cortisone have been shown to control the symptoms of hay fever, although cortisone taken orally is preferred because of the ease of administration. It may be necessary to administer as much as 200 mg. of cortisone daily for a few days to bring hay fever symptoms under control after which 100 mg. daily usually suffices to control the symptoms. After the worst of the pollen season is over even less cortisone may be given. Keeping in mind the availability, cost and possible side effects of these hormones at the present time, the treatment of hay fever with these drugs should be considered experimental, and be reserved only for those patients who are having enough trouble from hay fever to justify its use.

The hay fever sufferer who needs an appendectomy, or perhaps some other emergency surgical procedure during his hay fever season, might benefit from having either cortisone or ACTH therapy to insure a more comfortable convalescence. The patient should be kept in a pollen-free room before and after operation as a precautionary measure.

During the past two years we have treated 35 patients who had respiratory allergy, with cortisone or ACTH. Nine of these patients had both bronchial asthma and nasal allergy and some of these were treated simultaneously for the two conditions. Data on these 9 patients are included in both groups. Twelve of the 35 patients were afflicted with hay fever and vasomotor rhinitis. Five patients with severe fall hay fever owing principally to ragweed pollen were treated with cortisone; 1 patient received ACTH, and 1 additional patient received cortisone for hay fever the first year, and the next year received ACTH (table I).

TABLE I.

VASOMOTOR RHINITIS AND HAY FEVER:
12 PATIENTS, 26 TO 60 YEARS OF AGE

Cortisone: 50 to 200 mg. daily for 6 to 21 days
ACTH: 25 mg. or less every 6 hr. for 2 to 15 days

	Cortisone	ACTH	Total Treated
Hay fever Patients treated	6*	2*	7
Relief during treatment Moderate to marked	5		
Little	1		
Relief after 2nd and 3rd course Slight to moderate		1	
Relief during and after course		1	
Vasomotor rhinitis Relief: moderate to marked for 3 days to 5 weeks	3	2	5

*1 patient received courses of both cortisone and ACTH.

Moderate to marked symptomatic relief which was confined to the period during which cortisone was administered was noted in 5 cases. One patient received little if any relief, apparently because of inadequate dosage. Of the two patients treated with ACTH, 1 was remarkably relieved by 2 courses of treatment ten days apart and each of forty-eight hours' duration. The other patient noted slight to moderate relief after the second and third of a series of 3 courses of treatment at intervals of five days.

Five patients with perennial vasomotor rhinitis were treated: 3 received ACTH, 2 received cortisone. All of these reported marked symptomatic relief which continued for a few days to five weeks after medication had been discontinued. Nasal polyps were observed to shrink to at least 50 per cent of their original size permitting easy breathing through the nose, and the sense of smell returned.

We have treated 32 patients afflicted with asthma with cortisone and ACTH. Our experience is summarized in table II. Four patients had been disabled completely for as long as three years; 1 patient had had asthma for forty-one years.

TABLE II.

BRONCHIAL ASTHMA:
32 PATIENTS, 19 TO 69 YEARS OF AGE

Cortisone: 500 mg. to 15 gm. given in 5 to 216 days
ACTH: 140 to 2,825 mg. given in 3 to 180 days

Drug	Results	Patients
Nonseasonal asthma (27 patients*)		
Cortisone	Moderate to complete relief for 3 to 8 wk. after course	14
	No benefit (emphysema 1 case; inadequate dosage 2 cases)	3
ACTH	Moderate to complete relief for 3 to 5 wk. after course	13
	Difficult to assay	1
Seasonal asthma (5 patients†)		
Cortisone	Complete relief in 24 to 48 hr. after first dose	4
ACTH	Complete relief after first dose	1
	Sporadic nondisabling attacks	1

*4 patients received courses of both ACTH and cortisone.
†1 patient received courses of both ACTH and cortisone.

Relief from asthma generally was experienced earlier after the administration of ACTH than after cortisone.

One very valuable use we have found for cortisone and ACTH has been the control of severe intractable asthma of patients who need to have major surgical procedures. It is necessary to delay most major surgical procedures for patients who have asthma until the patient's cough, paroxysmal dyspnea and orthopnea are well controlled.[4,5] This is particularly important in surgical procedures directed to the thoracic, renal and upper abdominal regions, in which splinting of the diaphragm occurs postoperatively. Usually, but not always, a preliminary period of hospitalization with symptomatic treatment and appropriate attention to any existing complications of asthma suffices to get the patient ready for the needed operation. We recently encountered difficulty, however, in bringing the asthma of 4 patients who needed surgical attention under control within a reasonable period. One patient who had colic from gallstones received cortisone in preoperative treatment of her asthma. This brought about prompt remission of the asthma, which permitted successful and uncomplicated cholecystectomy. The second patient had a large incarcerated umbilical hernia; ACTH was resorted to when other measures were not adequate to control her asthma and to make repair feasible. The third patient, who had intractable asthma and vasomotor rhinitis, was readily prepared for thyroidectomy with the use of ACTH. Thyroidectomy was carried out without incident for the fourth patient, who had asthmatic bronchitis and mild emphysema, after preoperative preparation with cortisone given orally.

It is not to be wondered that many patients have wanted to try cortisone or ACTH for their asthma, sometimes without first undergoing a thorough investigation of their asthma problem. Too often dejected patients are now appearing with the remark, "I was given cortisone and ACTH, and it seemed to help me at first, but I am still having asthma. What can I do now?" A careful study of some of these patients has revealed complications such as sinusitis, bronchitis and even bronchostenosis, none of which cortisone or ACTH could be reasonably expected to control.

Since the effect of cortisone and ACTH therapy in respiratory allergy is not permanent or curative, it is obvious that we must return to first principles in the treatment of asthma if we are to get lasting results. First, we must ascertain the causes of the patient's asthma, then remove the causes together with any complications, and utilize cortisone and ACTH as we would other symptomatic remedies to tide the patient over, during the periods of investigation and treatment.

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Coexistent Rheumatic and Arteriosclerotic Heart Disease

Rheumatic heart disease may occur in the elderly without precluding arteriosclerotic change. Although both factors should be considered in treatment and prognosis, in most cases the valvular condition is not even thought of.

In Beth Israel Hospital, New York City, Julius Chasnoff, M.D., and Aaron Silver, M.D., found records of 66 persons aged 40 years or more who had postmortem proof of rheumatic heart disease. Atheromatosis of the coronaries was observed in 27, or 41 per cent of the group, and vessels were significantly narrowed in about half.

Since about two-thirds were women, the incidence would probably be higher with males and females more evenly divided. Diagnostic errors before death were common, and as a rule the rheumatic state was overlooked. Coronary disease was mistakenly suspected in 7 instances.

Both diagnoses were made during life in only 5 cases, and in none of these were the coronaries anatomically involved. Precordial pain with or without radiation was a major symptom in 20 subjects, 10 without actual sclerosis.

Although rheumatic disease may be active in later years, evidence is difficult to obtain. Mitral stenosis may cause only a systolic murmur or none at all. Right axis deviation in the electrocardiogram is uncommon, and the roentgen appearance may give no clue. The greatest source of error, however, is a mind closed to the possibility.

Julius Chasnoff, M.D. and Aaron Silver, M.D.: The coexistence of rheumatic and arteriosclerotic heart disease in patients over the age of 40 years. Am. Heart J. 42:809-813 (December) 1951.

Urological Anesthesia*

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A realization that spinal anesthesia is generally inadequate for overall urological surgery and an awareness of Mathe's work in 1947, stimulated the author to an investigation of the newer approaches to anesthesia, both in his private practice and in cases on the urological service of the Veterans Administration hospital in Fargo.

Spinal anesthesia was introduced about 1917, became very popular in the 20's and 30's, and is still used to a considerable extent. It affords excellent relaxation but drastic declines in blood pressure, not infrequently jeopardizes insufficient coronary arteries, and often actually precipitates thrombotic attacks. Rarely transient paralyses occur and intractable headaches are occasionally most troublesome. Recent observations on spinal anesthesia utilizing Nupercaine and Xylocaine, have in a measure overcome some of the above undesirable reactions.

Pentothal Sodium, the successor to the original intravenous anesthesia known as Evipal, was originally thought to be only applicable to patients requiring short anesthesia, for such procedures as cystoscopic manipulations, and minor urological surgery. Experience in major general surgery, as well as urological surgery, has shown that Pentothal Sodium properly administered, can be ideally suited for average length major urological cases. The absence of any secondary surgical excitement stage has rendered it particularly beneficial for the elderly poor risk patients so frequently encountered in urological practice. The coincidental administration of oxygen actually stimulates heart action, and when combined with carbon dioxide, has a directly beneficial effect on the respiratory center itself.

The two most important reactions to Pentothal are laryngeal spasm and respiratory arrest. The former can usually be avoided by the preoperative administration of atropine, grains 1 to 150, or therapeutically treated by the intravenous injection of a like amount of the same drug. Respiratory arrest is a distressing complication, only fully appreciated by those who have had the misfortune to experience it. It is the prophylaxis of this serious and sometimes fatal complication, which Mathe has keynoted in his contribution, *the total avoidance of preoperative morphia administration and the substitution of barbiturates in its stead.*

Should respiratory arrest occur the drug must be discontinued immediately and Coramine (5 cc.), Lobeline (2 cc.), or Metrazol (3 cc.) given intravenously, artificial respiration started immediately, preferably by mechanical apparatus, and oxygen and carbon dioxide administered by mask.

The patient is given at hour of sleep the night before surgery, grs. 1½ of Neumbutal (Abbott), or Delvinal Sodium (Sharpe and Dohme), the latter creating less mental depression the following morning. This dose is repeated in the morning plus grains 1.150 of atropine. Two and one-half per cent solution of Pentothal is used intravenously in conjunction with 1000 cc. of intravenous fluids.

Contraindications to the administration of Pentothal anesthesia are: (1) children under six, (2) patients with severe nitrogen retention, (3) upper respiratory infections or obstructions, such as laryngitis, peritonsillar abscess, or significant tonsillar enlargement.

Elimination of Pentothal from the body takes place slowly, especially when compared with the inhalation anesthetics such as cyclopropane, ethylene, nitrous oxide or ether. Not infrequently elderly patients will sleep nearly 24 hours postoperatively, unaware and often refusing to believe that they have been operated upon.

At the Wesley hospital of Northwestern University medical school in Chicago, as early as 1945, in a review of 973 urological cases, intravenous anesthesia surpassed all other methods and counted for nearly 70 per cent of all those administered.

On the urological service of the University of Minnesota medical school in Minneapolis, the combination of curare, 100 units (1 cc.), with 19 cc. of two and one-half per cent of Pentothal Sodium, is used routinely in cases of short duration, and is used adjunctively with the endotracheal administration of nitrous oxide, cyclopropane or ethylene gases. The latter two, however, because of their explosive properties are contraindicated in the presence of the cautery or the electro-surgical unit. Thus, by the use of small quantities of relatively weak anesthetic agents, lighter planes of anesthesia are achieved, fully effective for the necessary surgery. With this combined routine a minimum of the unpleasant postoperative symptoms, such as nausea, vomiting, depression, distention and hypotension occurs.

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*Presented before the North Dakota State Urological Society's annual fall scientific session September 28, 1951, Fargo, North Dakota.

On the author's service at St. John's hospital, Fargo, from September 1947 to February 1951, a total of 528 urological procedures (see table I) were carried out under Pentothal Sodium, with no preoperative morphine regime. This was combined with endotracheal inhalation anesthesia in a few longer, more difficult surgical procedures. *There were no anesthetic incidents, accidents or significant complications in this entire series.* Four deaths occurred, three of which followed pulmonary emboli after kidney surgery, and one due to an acute pulmonary edema in a cyanotic, hypertensive prostatic in complete retention. The resulting surgical mortality was seven-tenths per cent.

TABLE I.

CASES IN THIS SERIES

Cystoscopies	220
T. U. R.'s	139
Nephrectomy	
nephrotomy	
nephropexy	56
Suprapubic	
operative	33
Ureterolithotomy	4
Orchiectomy	
bilateral	28
Manipulation for stone	8
Urethral caruncle	8
Hydrocelectomy	5
Circumcision	3
Varicocelectomy	2
Ureterocele	1
Ureteral dilation	3
Bladder dilation	2
Reanastomosis vas deferens	1
Bladder polyp coag.	2
Total	528

Brief mention should be made of the use of a topical anesthesia for the male urethra so necessary in urological practice for instrumentation of one sort or another, and for the poor risk cystoscopy patient.

A water-soluble jelly, the basic ingredient of which is Intracaine, was reported by Corbus of Chicago in 1949, and has been found extremely satisfactory by the author, more especially for office procedure. The formula for this compound appears below:

Intracaine Hydrochloride (Squibb)	20.0 gm.
Phenol liquefied (U.S.P.)	5.0 cc.
Boric acid (U.S.P.)	80.0 gm.
Tragacanth (Ribbon U.S.P.).*	40.0 gm.
Glycerine (U.S.P.)	200.0 cc.
Acqua Dest. (q.s.)	1000.0 cc.

*Pharmaceutical note: The soaking of the ribbon tragacanth in water for twelve or preferably 24 hours is extremely helpful in maintaining this preparation at its desired consistency.

SUMMARY

Contrary to the opinion of many, Pentothal Sodium intravenous anesthesia, when combined with curare, oxygen, and no preoperative morphia, used judiciously has been found to be the most suitable anesthetic agent yet employed by the author for the poor surgical risk patient, in a moderately active urological practice.

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1870

> "It is well to bear in mind that professional mishap to any physician is a hurt to us all, and that any seeming advantage in the eyes of the laity, gained by any of the forms of quackery, not a disciple of Hippocratic medicine, is a common misfortune. It matters not what our personal relations are with our colleague, who perhaps, after intelligent, faithful service, has had to give place to some ignorant layer on of hands or dealer in specifics. The indignity to him is to the whole body of the profession."

Samuel D. Flagg: An address to the Ramsey County Medical Society.
Northwestern Medical & Surgical Journal (The Journal-Lancet) 3:327-331, 1872

Simplified Percutaneous Angiography

GORDON L. SMILEY, M.D.

Saginaw, Michigan

PERCUTANEOUS CAROTID PUNCTURE has become an accomplished skill of many angiographers. However, the present status of this procedure in most clinics is that of an uncertain substitute for the open method. Failures of filling and the incidence of neck hematoma are common enough to discourage the use of this technique. Various methods involve the use of sharp needles and complex tubing, stopcocks, syringe systems and anticoagulant solution. Most techniques require a sterile nurse and one assistant.

Failures can be usually attributed to the injection of contrast medium into the perivascular tissue in spite of excellent arterial reflex in the injection system both before and after injection. This disturbing phenomenon is explained by unwitting transfixion during forcible injection or by forcing the vessel away from the beveled point. As skill develops, fewer failures result from inability to "hit the vessel." Caliber and palpability of the carotid arteries do not appreciably influence the success of puncture, although the extreme mobility of the large, bounding superficial vessels may render them a deceptive target.

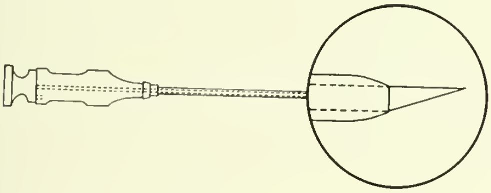

Fig. 1. Cross-section, lumbar puncture needle.

Complete simplification of equipment and method has largely obviated these difficulties. The use of a special angiographic needle has permitted this simplification (figure 1). An 18-gauge lumbar puncture needle (6.0 cm. shaft) was revised by grinding the bevel down to a blunt point with gradual taper so that the sharply beveled stilette protrudes 1 mm. through the bluntly tapered shaft. The head is extended. The needle is held with thumb over hub and introduced with stilette bevel up at the thyroid cartilage level. The common carotid is engaged just above this level by the almost perpendicular stilette which guides the shaft into the lumen. Usually both walls are penetrated. After removal of the stilette, the shaft is cautiously withdrawn until arterial reflux appears. Then the shaft is advanced in the axis of the artery 1 to 2 cm. and stilette replaced. With the needle securely in the lumen, the head may be put into the desired position without attention to the needle. A 10 cc. syringe, containing 6 to 8 cc. of contrast medium, is connected directly to the needle after removal of the stilette and injection completed. Then the stilette is replaced while awaiting film development or repositioning.

Fig. 2. Equipment for carotid puncture.

Timing is more accurate, the volume of contrast medium is reduced, awkward disruptible tubing systems are unnecessary as is anticoagulant, and the method requires only one operator. Replacement of the stilette permits leisurely rinsing and filling of syringes. Hematoma is unusual. The quality of angiograms obtained by this method is quite consistently good. Failures are confined to those rare instances in which the vessel cannot be punctured. Although puncture with this needle seems more difficult at first, its continued use leads to a high proportion of successful "hits" and a secure feeling that one has finally achieved a relatively certain and easy method of percutaneous carotid angiography.

(Continued on page 170)

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Psychotherapeutic Problems with University Students

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PSYCHOTHERAPEUTIC problems with students on a university campus are not confined to the treatment process itself. The time involved, relationship of the student, psychiatric clinic, administration, and academic faculty must be kept constantly in mind. The fact that advisors have always been part of a university system, added to the fact that advisors give advice, has so influenced the whole area of helping students that institution of sound psychotherapy is impossible if considered in terms of the students themselves.

Although some sort of psychiatric consultation has been used by most colleges for many years, it has been used primarily to determine a student's ability to function as a student on the campus, or for diagnosis and recommended disposition of psychotic students. Some large universities, especially those associated with medical schools, have had half-time or full-time psychiatrists available for consultation and treatment during the past 25 years. However, it is only since the important relationship between emotional illness and somatic disorders has been recognized that the dynamically oriented psychiatrist became an integral part of student health services. The addition of a psychiatrist did not solve the problem of the emotionally disturbed student, but made the staff more aware of this problem as well as the fact that therapeutic tools were inadequate with the artificial delimitations of the campus. The student health psychiatrist then not only had to utilize what tools he had but develop new ones to meet the needs of the campus.

When considering treatment in a college, university, or even high school, we must think in terms of adolescents, despite the fact that many college students are now much older chronologically than the usual limits of adolescence. They must be considered adolescents primarily because most of them have continued development in a dependent role in a teaching institution, or if interrupted, in a dependent role in the military services. Although many of our students are married and many more are working for part of their expenses, very few have ever had to assume any continuing responsible adult role in society.

The number of students who need help at any one time is difficult to determine. Various estimates have been made but they vary from four to 18 per cent of the student body. From the experience of most university psychiatrists, persons who could best utilize help seldom come and ask for it, but tend to muddle through the best they can. The patient who does come in for help is usually seriously ill, or at least has been sick over a long period. We do know that on the University of Washington campus during 1949-50 less than two per cent of all students applied for help at the psychiatric clinic, and that only 35.5 per cent of those referred were treated intensively with active psychotherapy.

When discussing psychotherapy on the campus, it is important to include all the non-medical "counseling" agencies as well as the psychiatric staff, since these agencies see the greatest number of students and attempt to give some sort of therapeutic help. This may vary from direct advice and suggestion to reassurance or intensive case work administered by a social case worker or clinical psychologist. This is especially true on our campus, where both the Office of Student Affairs and the Counseling Center have trained case workers and clinical psychologists on their staffs. Individual faculty members and administrative offices of various deans all are active in helping students with their problems on the campus. Most of these students present their problems as academic ones, quite similar to the presentation of a mildly disturbed child by deeply disturbed parents in a child guidance center. Nevertheless, in only a few instances are untrained advisors aware of this phenomenon. Most faculty counselors handle the students' problems entirely at the academic level.

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At first this would seem to be a bad state of affairs, not only ineffectual but possibly dangerous. It is the feeling of this clinic, however, that nothing should be done about changing this relationship between deans' offices and faculty advisors and the students. It is impossible to expect general faculty and deans to be trained intensively in clinical case work and psychodynamics. Further, it is dangerous for people without special training to attempt to reach below a presenting academic problem and deal with subtle emotional problems. Further, many students have enough defenses so that when faced with a problem, they ask for help. The parental relationship between advisor and student is enough in many instances to stave off the superficial anxiety. Here the psychiatrist's role should be primarily that of helping the advisor recognize the serious emotional disorders and in helping him make proper referrals to the proper diagnostic and psychotherapeutic units. These advisors have a definite purpose and function on the campus. They have an intimate relationship with the student in the accepted milieu —his academic work—and are therefore in a better position to offer that superficial help than any other agency on the campus. Since they are helpful in the greatest majority of cases, their activity dealing primarily with academic adjustment must be called psychotherapeutic. Furthermore, the friendly relationship thus established between psychiatrist and advisor makes it easy for the advisor to consult the psychiatrist without fear of being considered inadequate and developing some hostility toward the psychiatric unit.

The role of the psychiatrist changes with regard to the agencies which have a specialized function, which are developed to give specialized help to the individual student, and which have the necessary trained personnel.

First of all, there are those agencies which also do the generalized testing on the campus. Interpretations of test results to students should be handled by trained individuals who recognize the various ways in which students accept these results and who are ready to aid those who have any anxiety related to the results. Further, the psychiatrist should have a close relationship with all persons doing counseling or case work with students so that these lay therapists can be helped in recognizing the dynamics of the individual case and may receive advice in psychotherapeusis. On the University of Washington campus there are regularly scheduled consultation periods with the case worker and clinical psychologist where the diagnosis, including psychological tests and therapeutic plan and procedure, is discussed fully with non-medical staff. This not only assists the counselor or case worker, but allays anxiety in the therapist when faced with a difficult problem. It aids the student by helping in a diagnosis which may determine whether any psychotherapy is indicated. Since psychiatric consultation has been instituted with the counseling agencies on the campus, more students have been adequately treated and fewer seriously ill students have been misdiagnosed.

The psychiatrist should also work with the administrative bodies that deal with students who are being considered for disciplinary or some other action relative to their status on the campus. In this instance he acts as a consultant, giving only his impression of the dynamics involved in the behavior of the student. He seldom, if ever, advises the action but allows the committee or agency to remain autonomous and to determine their action according to the facts plus psychiatric evaluation. The administrative bodies and psychiatric unit on the University of Washington campus have so worked together and again, it has helped to give a feeling of adequacy to the administrative group and promoted ease in the use of psychiatric consultation.

The other major function of the psychiatrist within the health center is the direct treatment of referred students. Referrals are made by the student health physicians, by any other agency on the campus, or by the student himself. Consultation and aid in the psychosomatic study of students under care by other members of the medical staff is offered.

Formerly, the greatest number of referrals came from the health center physicians. However, this has been changing so that at present probably the number of students who refer themselves is equal to the number referred by the student health physicians. This in itself has increased the treatment load of the unit especially since self-referrals are asking for psychiatric treatment. Those referred by somatic physicians often resent the idea that there is psychological involvement or are not ready to accept anything but mechanical or pharmaceutical help. It has been our experience that in most of the latter cases the somatic physician himself can do the best psychotherapeutic job. It is for this reason that the psychiatric clinic staff makes itself available to discuss the possible dynamics involved and to suggest the best means by which the somatic physician can carry out a psychotherapeutic program.

It is true that consciously most physicians will refer patients to psychiatry so the patient may receive help or so that they may have consultation on a problem that they are unable to handle or understand. However, the frustration and anxiety associated with not being able to understand a patient, make a diagnosis, or help him adequately results many times in suppressed anger. The referral may be done in such a way that the patient feels that the doctor believes that he is different, inadequate, and that he has rejected him. The return, therefore, of such a patient to such a physician is not constructive therapy. In other words, the diagnosis of the referral is essential in the therapeutic program.

It has been our experience again that the psychiatric team of clinical psychologist, psychiatric social worker and psychiatrist, utilizing their various approaches and pooling their experiences in a staff meeting in which the referring physician is included as an active participant, can evolve the best plan for psychotherapy.

In those cases in which the staff feels that some form of psychotherapy by a member of the psychiatric team is indicated, the many-sided problem of adequate psychotherapy appears. It must be pointed out that more persons for whom psychotherapy was indicated and who were ready to accept it were referred to private psychiastrists for treatment than were treated within the campus psychiatric unit. The number taken on for psychotherapy was limited by the time available aside from time expended in consultation and diagnosis. As has been stated before, this was approximately 36 per cent of all applications made. However, even then the problem of adequate treatment was not solved.

In contrast to the usual psychotherapeutic plan, one could not just set up hours and frequency of interviews. These had to be determined by the availability of the patient and the clinic staff. The question of class hours had to be considered. Continued treatment had to be interrupted because of such factors as examination schedules and delimitation of academic quarters. Although this problem has not been settled, experimentation in various forms and methods of psychotherapy is continuing. Two main divisions have evolved: (1) patients receiving individual psychotherapy, and (2) those students who could be associated in a somewhat homogeneous group in group psychotherapy.

As regards individual psychotherapy, after the diagnostic procedure and staffing is completed, the student is assigned to a member of the psychiatric team who is available and who, it is felt, is best suited to that type of case. The non-medical members of the team are directly under the supervision of the medical members. It has been our experience that no single interview should be shorter than 50 minutes, nor should a student be seen less frequently than once a week. An attempt is made to take on for individual psychotherapy those students who, the staff feels, can respond readily to help, preferably within a time limitation of two academic quarters. Serious character disorders are not started in individual psychotherapy because extraneous factors may cause discontinuance, leaving the student less adequate than he was before. These students are either advised to wait until they are through school or, if they can afford it, referred directly to private psychiatric help. Exceptions are made in cases of serious character disorder where there is a good deal of presenting anxiety. It has been our experience that one can help these students at last complete a phase of their academic training even though their basic character structure may continue to be inadequate.

The second form of treatment, group psychotherapy, has been found to be very satisfactory on a college campus. Groups are limited to six to nine students of the same sex. The group meets twice weekly for periods of 50 minutes. Both a man and woman staff member are present, with the man the group leader for men students and the woman the leader for women students. The criteria for group psychotherapy have not yet been definitely decided, but for the present, patients are chosen primarily from the results of clinical and psychological examinations determining, if possible, the presence of a fairly intact personality structure and of overt anxiety. Those students with somatic symptoms do especially well in group psychotherapy.

We have found that during the weeks just prior to the end of a quarter many students come in with acute anxiety not only related to the taking of examinations but primarily related to the ending of an episode or era of dependency. It is our feeling that these students need help in accomplishing their goal of completing the quarter as adequately as possible. Therefore the entire staff makes as many hours as possible available so that these students can resolve their anxieties enough to face the examination ordeal and the ending of the quarter without failing or withdrawing.

(Continued on page 168)

MEDICAL
VOCATIONS

With this article by Dr. Hewitt on the work of medical editors, The Journal-Lancet *inaugurates a series of articles, which will appear from time to time, on the vocations and professions which are closely integrated with the practice of medicine. It is hoped in this way to give the physician a broader knowledge of the training required, the general scope of duties, and the problems faced in the work of his professional associates.*

Medical Editors and Their Work

RICHARD M. HEWITT, M.D.[*]
Rochester, Minnesota

Now that a large share of persons engaged in various occupations are organized to a degree that is bewildering or reassuring, depending on the point of view, it may be refreshing or discouraging, depending on the point of view, to consider an occupation which is unorganized to the point almost of being disorganized. The only society of which I know that offers a rallying ground for all medical editors is the young but game and expanding American Medical Writers' Association. It hopes to furnish, or to help to establish, facilities such as now are to be named.

As yet, however, there is no directory or registry of medical editors. There are no recognized or well-known training schools for those who would enter the profession. There have been set no minimal standards in education or experience which one who would call himself a medical editor is expected to meet. Consequently, if a number of buyers of medical editorial service should confer, probably few would have the same idea of what they were buying. Moreover, the purveyors of the service—the medical editors no less—might be only slightly more in agreement as to what they were under obligation to supply.

You and I might do well, therefore, to examine what we are, figuratively, talking about. After we have done that, not much may remain to be said. At all events, let us begin by dividing medical editors into two classes, the professionals and the amateurs, remembering in this as in all else that is attempted here in the way of classification, that circumstances alter cases.

PROFESSIONAL MEDICAL EDITORS

The professionals usually are full-time workers and there are many kinds of them. I shall try to define their varieties by describing their duties. Then I shall attempt to classify the training which many of them have undergone.

Duties of Professional Medical Editors. Editor-in-chief. — He is responsible for everything in his journal, or book, or set of books, as a surgeon is responsible for everything that takes place in the operating room. Just as he gets credit for much that is done by his subordinates, so he should insist on taking the blame when they make mistakes. He plans his publication and, under the publisher, sets and maintains its scope, aims or policy. He has wide acquaintance among potential authors and solicits from them some of the material he prints. He reads nearly everything submitted to, or prepared for inclusion in, his publication. He makes the final selection of material. He writes editorials, prefaces and so on. He does little or no further work on the text of his publication.

Managing Editor. — This person co-ordinates authors, editors, printers, engravers, proofreaders, binders, shippers, and I have not named them all. He is responsible for getting the publication out on time. Much of the correspondence incidental to the foregoing duties falls to him to write. He may or may not read the manuscripts submitted for use by his publication.

Manuscript, or Copy, Editor. — The duties of manuscript editors vary so greatly that it seems best to subdivide them into grades. The grades, and the responsibilities of those who exemplify the grades, increase in parallel.

Manuscript editor, grade 1. — Among all manuscript editors, the duties of those of grade 1 are least extensive. They consist merely in indicating to the printer the kinds of headings, the style and size of type, the length of line, indentations, and so on, in accordance with the customs of, and the equipment available in, the house where the editor is employed.

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Manuscript editor, grade 2.— He is responsible for all that is mentioned in the previous paragraph. In addition, he makes editorial changes in agreement with the style of the house or office in which he works. These changes have to do with such matters as spelling, capitalization, use of italics, punctuation, and even certain constructions which are used in the house in preference to others.

Manuscript editor, grade 3.— This individual does all that is done by his fellows of grades 1 and 2. Also, he performs extensive editorial work but not ghost writing or research, and the last applies to library research as it obviously applies to laboratory or clinical research. He straightens out manuscripts as they lie before him; he does not range widely through the literature of any and all subjects in an effort to determine whether an author has read or copied sources correctly. He remedies faulty diction, faulty sentence structure and paragraph structure, faulty structure of the whole and erroneous arithmetic; he clarifies terminology, categories and the thought (logic), all of these in so far as internal evidence will allow him to do so. If he finds, or suspects, that a paper does not agree with itself, he makes it so agree, if he can, from what the author has included in his manuscript. If he cannot make it so agree from what the author has written, he notifies the author to that effect, in writing, in the margin of the manuscript or possibly by means of a letter. If he has reason to suspect that something else is wrong but he cannot confirm or confute his suspicion from examination of the manuscript or by consultation of reference books available in his office, he similarly requests the author to consider the doubtful point. His place is primarily at his desk, not, as has been said, in the library or elsewhere.

Manuscript editor, grade 4.— The duties of one of this grade include all that has been outlined above and, in addition, he verifies the author's list of references to see that he has copied correctly names, titles and everything else that makes up a reference. There are two ways of doing this: (1) to pull from the library shelf the actual volume referred to, which is the more thorough but more time-consuming method; (2) to find the reference in one of the indexes, such as the *Quarterly Cumulative Index Medicus*. An editor of this grade also brings the list of references into agreement with the text in so far as he can do this without reading the author's sources.

Manuscript editor, grade 5.—This person, again, does all that his colleagues of lower grades do. Also, he reads the printed matter to which the author refers, and possibly somewhat more widely, in an effort to determine whether the author has quoted correctly, paraphrased correctly, and drawn correct inferences from what he has read. This type of service seldom is furnished by a publisher because it is too time-consuming and therefore too expensive. Yet the ability to read, quote and paraphrase accurately is less common than most people realize; it is even less common probably than the ability to draw correct inferences when what is read is fully comprehended.

Manuscript editor, grade 6.—All that has been described in foregoing paragraphs, this person does. But, furthermore, he trusts the author in no respect whatever! On the contrary, he gets the author's original work sheets, case records, laboratory data and anything else of an original nature that he can obtain, and he verifies the manuscript in every particular. He repeats the statistical analysis and other mathematics, looks up the doses, reads all around the subject and becomes sometimes, as far as reading is concerned, more a master of the author's subject than is the author himself. This type of service probably never is available except as it is arranged between individuals.

Rewriter.—The rewrite man may do all or only part of what has been indicated in the foregoing. In any case, he throws away all, or most, of the author's manuscript and rewrites it in his own words. He is not an editor at all but a rewriter; yet this is the type of service which some medical authors think of when they think of medical editing.

Ghost Writer.— This person probably will do none of what has been described. He does not receive a manuscript from the author but gets notes or original material from him, or perhaps interviews him, and writes the whole paper which bears the author's name. Such a worker is not an editor but a ghost writer; yet such service is what some physicians believe a medical editor is expected to furnish.

Preparation for the Position of Professional Medical Editor.— What follows is not related, step by step, to the foregoing; that is, it is not to be assumed that the duties of a manuscript editor, grade 1, are necessarily to be performed by a person whose preparation has been that of what is now to be designated as class a.

Preparation, Class a. — The person concerned almost always is a woman, and she is an exception to the idea that professional editors devote full time to editorial work. She does not. She has no college degree but may have completed a business course, wherein she has become habituated to accuracy and hard work. She is a medical secretary whom her employer has pressed into work on his infrequent papers. She is still his secretary, handles his correspondence, makes his engagements, and all that. She may or may not be capable of developing into an expert medical editor. In any case, she has no opportunity so to develop. Her editorial help, however, is likely to be better than none. The danger that attends her efforts is that her employer may give her tasks which are beyond her capabilities; yet neither she nor he may detect the faults in their joint work.

Preparation, Class b. — This manuscript editor may or may not have a college degree. Usually such a person is a woman who starts her professional work as a medical secretary. Gradually she takes on more and more editorial work for her employer who is, or becomes, prominent and writes a great deal. Or her employers may be a small group of physicians. In time, almost all of her work is of an editorial nature; somebody calls her an editorial secretary and the name sticks. She may become reasonably competent and stop there in her development. Again, by dint of native intelligence, daily saturation in a medical atmosphere, and great industriousness which leads her to study much on her own time, she may become highly competent.

From there, this editorial secretary may move into a publishing or other organization where she learns what she needs to know of printing and publishing. In about fifteen years from the time that editorial work began to take all her attention, she can think of herself as a fully qualified medical editor. That is long, but she started with little of what she had eventually to acquire in knowledge of medicine, of the basic sciences, of printing and publishing and perhaps of English composition and of logic. An encouraging thought is that she got paid while she was becoming educated. Moreover, she is a person who derives satisfaction from achievement; otherwise she would not have stayed at the task. Such a woman may become absorbed and thoroughly happy in the work that has been described.

Preparation, Class c. — The person concerned, male or female, has at least a bachelor's degree and is qualified in English composition and logic. One hopes that he knows some science too. If he does not, he must be able and willing to acquire knowledge of medical sciences and of medicine itself. He has never been a secretary, may have been a teacher, may have worked in a publishing house. If he is willing to work in and out of hours when he is young, and has native intelligence, he may become thoroughly competent in ten years for the work of a medical manuscript editor, grade 3 to 6, or even for the position of editor-in-chief.

Preparation, Class d. — This person has the M.D., or perhaps the Ph.D. or D.Sc. earned in work closely allied to medicine. He is also qualified in English composition and logic. Given this education, plus native intelligence, industriousness and conscientiousness, he can pick up what he needs to know of printing and publishing and, in a year or so, he will more than earn his keep. For acquirement of knowledge of the obscure ways in which authors habitually fall into error, and for the detection of these errors to become second nature, probably three to five years are required.

Thereafter, a person equipped as has been described should be able to do almost any medical editorial work. His background in medicine or allied sciences gives him added value because he will be likely to detect errors in matters of fact for which he is not strictly responsible; for instance, errors in dosage or anatomy. He will be unlikely, in trying to correct bad English, to achieve anatomic or medical nonsense stated in good English. He tends to be a safe editor because he realizes the limits of his own knowledge. If he has spent time in practice, laboratory or statistical work, printing or publishing, if he is a linguist, or if he has been grounded in scholarly method, of course his value is enhanced.

AMATEUR MEDICAL EDITORS

These persons seldom devote full time to editorial work, yet they are useful. Commonly, such an editor is eminent in some field of medicine or surgery. He is likely to know personally authors who are writing in his field, to be aware of the soundness or unsoundness of these authors, and to be acquainted with what has been done and what remains to be done in the field. Consequently, he is in a position to solicit papers from desirable authors and to pass judgment on the soundness of purpose of a manuscript. He also will detect, from his knowledge of his subject, advocacy by an author of a view that is absurd or of a conclusion that goes against known facts.

Yet his own papers may be as faulty as any he receives, from the standpoints both of English and of internal evidence of validity. The errors to which such a person is liable himself, he commonly does not detect in the work of others. Often, therefore, he is incapable of detailed examination of a manuscript.

COMPENSATIONS: CONCRETE AND ABSTRACT

From what has been written, it should be apparent that before a medical editor and an employer decide to join forces, each should clearly understand the following: what grade of editorial service the employer wishes to buy and what he is willing or able to pay for it; whether the editor is equipped to deliver that grade of work and whether he can afford to furnish it at the price. Such preliminary understanding may forestall later unpleasantness.

Medical manuscript editing is likely to pay fairly well, largely because few are qualified for the work. On the one hand, well-trained physicians can be found; on the other, experienced, even gifted, writers are plentiful. Seldom, however, do the qualities of the twain meet in one person. The physician's mind has been trained to store prodigious quantities of fact and experience, and his associative aptitude is extremely acute. Probably his mind is trained in the best possible way for the work he must do at bedside, operating table and laboratory bench. Certainly, he can accomplish wonders. Usually, however, he has served only an extremely brief apprenticeship in what Professor Bredvold called the abstract and formal disciplines, those which tend to turn out a coherent—or for that matter an entirely valid—expositor. The professional writer, who has been saturated in the abstract and the formal, seldom has much of a foundation in science and usually next to none in medical sciences or medicine. Moreover, of those whose training has been broad enough to qualify them for medical manuscript editing, some do not care to do the work. The demand for medical manuscript editors, therefore, is greater than the supply and the pay, consequently, tends to be good, as has been said.

But you may ask, is this about bread alone? Well, no. For instance, I could have earned bread in several other fields of medicine than editing. I chose editing. Why?

First, in medical school it had appeared that a considerable part of the impediment to understanding the subject matter lay less in the difficulty inherent in the material itself than in the imperfections of its presentation on the printed page. Much of the so-called literature needed the labors of a journeyman expositor.

Second, partly by accident, I had undergone a long education and training that furnished a good foundation for medical editing.

Third, it seemed that just as education, graduate or undergraduate, was the most important aspect of medicine, so prompt dissemination of sound information to the members of the medical profession was the most consequential part of medical education. Publication was, and is, the practicable means of disseminating the most information to the greatest number.

Therefore, when the opportunity arose to participate in such educational work, as assistant editor of the *Journal of the American Medical Association*, under that genius Morris Fishbein, I joyfully accepted. I thought then that this ancient field of great traditions was one of continuing great use. I still think so.

But you wish to know, probably, whether medical editing confers happiness on the editor. For many years, until I asked to be relieved of some duties, it was the hardest, most confining, most fatiguing work I had ever done. On the whole, however, it has been satisfying.

Perhaps the position of the medical manuscript editor will be clarified by the analogy of the pathologist in the medical scheme of things. The pathologist sometimes feels that the internist looks down on him as an employee who for some strange reason chose to thrash around in an anonymous backwater of medicine, for inconsiderable financial rewards. The pathologist, however, is charged largely with finding out where the internist made mistakes. He does find out and this gives him a sense of superiority. Thus, each feels superior and each accordingly is happy. Both internist and pathologist may look down on the editor who, finding both in error, feels superior to both. Again all are happy—relatively.

The word "relatively" was added because manuscript editing is not carried on in an atmosphere of unalloyed sweetness and unclouded light. A few paragraphs back I wrote, "several other fields of medicine than editing." One of the hardest things for me to accept has been the conviction that most physicians do not consider medical editing to be a field of medicine. The medical editor is somewhat in the position of the late Arthur Train, the creator of Mr. Tutt. Train is said to have remarked that his lawyer friends considered him a literary man and his literary friends considered him a lawyer. Confidentially, such dichotomy at times confers dialectic advantages. No more of that however; somebody who is not an editor might read it.

Whether a layman (to you and me) reads the following is unimportant. When you are new at editing, you will be astonished someday to encounter an author who will misinterpret your efforts to be helpful and will resent them. Forget it. The chances are he is an inexperienced writer and will welcome your help when he has learned his own capacity for error. This is something, by the way, which a new editor must learn also.

Sometimes you may have tied yourself to a desk for days, mastering the contents of a manuscript and ferreting out the discrepancies which you suspected were there. At last, although your head is filled with the cotton wool of fatigue, you will have the satisfaction of knowing that the paper will be consistent in print. Just about that time you may recognize the voice of a friend of many years' standing who is conducting some visitors by your door: "This is where they dot the i's and cross the t's," he will say.

Then is when you will understand the wisdom of the law in admitting the verdict of murder in the second degree. This verdict I understand to mean: Yes, he killed the victim very dead, and we cannot overlook what he did, but he is scarcely to blame for it.

Seriously, however, you will find it necessary to adjust also to this: Your opinions relative strictly to your own field of medicine, which you will have offered to the medical profession through proper channels, sometimes will be passed over because you are not in the practice of medicine. A number of reasons may account for this phenomenon, some of them good and some of them bad. However, you will do best to call it a phenomenon and let it go. If you fall into a tail spin* about it you may end by muttering to yourself about being rejected and ignored. The matter will not be that serious nor will the slight be deliberate, believe me.

No, you and your authors are not antagonists but allies. Your enemies are not one another. You have a common, abstract, terrible enemy: disease. Most of the people who are in the fight against that enemy have something buoyantly admirable about them. Eagerly they give their secrets to each other, for the good of somebody else, who is unknown to either of them, and who cannot requite them for the benefits they have conferred. You, as an editor, will be one of the most energetic disseminators of these benefits. You can be proud of yourself and proud of the guild you serve.

Nor are the satisfactions of that service entirely the anonymous ones of knowing that you have devoted yourself to a worthy ideal. Since I have been a medical editor, I have been a member of two great teams. The second of these, moreover, supported me while, intermittently in World War II, I served another great team, the United States of America, as manuscript editor, mainly for a division of the National Research Council.

Under such circumstances, the editor becomes acquainted with some of the great figures of the day. Not all of them are of news value but their stature is recognized in their own fields. Some of these people the editor works among, knows by their first names and they become friends. The day-by-day interest of a life so lived is not to be minimized.

Moreover, in a good team some other intangibles come the editor's way. There is, once in a while, the stimulus of a meeting which he attends, held in a geographically interesting place, where interesting people assemble. Occasionally he is asked to address the meeting. Eventually he becomes known for his work and, by that time, perhaps the most pleasant of his personal relationships begins to emerge. He is in a position, occasionally, to help others learn his trade. When they come back to see him, or continue to write to him, then, for a few minutes, or hours, or days, his cup runneth over.

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*As an editor, I am in duty bound to assert that this is used as a metaphoric expression and not as slang. I so assert then, but I don't believe it.—Author.

Lancet CLINICAL REVIEWS

This new department of The Journal-Lancet *is devoted to reports on cases in which all appropriate diagnostic criteria have been employed, the best known treatment administered and the results recorded. It is desired that these case reports be so prepared that they may be read with profit by physicians in general practice, hospital residents and interns and may be of considerable value to junior and senior students of medicine. This department welcomes such reports from individuals or groups of physicians who have suitable cases which they desire to present.*

Massive Edema[*]

WILLIAM F. NUESSLE, M.D.[†] and
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This case is being reported because after repeated investigation the cause of the anasarca remains unexplained. It is our hope that this report will lead to further reports should others have met with this or a similar condition.

Mrs. D. is a 43-year-old housewife who has been troubled four years with anasarca, which was massive and poorly controlled in 1947, and has been low-grade but persistent in the subsequent years. She has had associated substernal pain, dyspnea, pigmentation of the neck region, and palmer erythema.

Past history reveals that the patient worked in a war plant for six years, during which time she glued plywood together. Shortly before her illness began, her husband was found to have active tuberculosis. She had inflammatory rheumatism at six years of age. There were a number of previous operations: one for ruptured appendix, another for bowel obstruction from adhesions, hysterectomy for "fibroids", and a hernia repair. System review was negative.

The patient's present illness began in May 1947 when she consulted her private doctor because of the sudden onset of profound weakness, frontal headache, swelling of the left cheek, nausea, and emesis. She soon developed eyelid and ankle edema. Four days after the onset of her illness, she was admitted to St. Luke's Hospital in St. Paul. She had gained 25 pounds in the four days of her illness, from her usual weight of 115 pounds to 140 pounds. She was found to have generalized edema. The lungs revealed dullness in the right base with a few rales in both bases. The heart was normal in size with no murmurs. Blood pressure was 100 over 70 and pulse was 100. Abdomen was negative. Reflexes were normal. Large, tender, discrete nodes were palpable in the neck, axillae, and groin.

Four urinalyses were normal. There was slight leukocytosis. Serum proteins were 6.2 grams. Chest x-ray film revealed some passive congestion in the right lower lobe, with slight cardiac enlargement. Enlarged nodes from the groin and axillae were removed and pathologically showed hyperplasia.

The patient was treated with a salt-free diet and diuretics. In spite of treatment, however, her edema increased. She gained 20 more pounds in the first two weeks of her hospital stay (to a weight of 160 pounds). She became more dyspneic and showed cyanosis at times. Her edema continued to increase so that she occupied *two* hospital beds. In the last two weeks she was unable to be weighed so that exact weight gain was uncertain.

In June 1947, she was transferred to the Mayo Clinic. Skin biopsy was performed and was thought consistent with the diagnosis of scleredema. Treatment consisted of pyribenzamine, salyrgan, ammonium chloride, and sedation. She showed little improvement and in August 1947 was discharged to her private doctor. Her anasarca became progressively worse and she developed dyspnea and precordial pain. Morphine was needed four times daily to control pain.

In October 1947 she was first admitted to Ancker Hospital in what appeared to be a terminal condition. She was unconscious and had Cheyne-Stokes respiration. The skin was cold and cyanotic. Blood pressure was 140 over 110. Pulse was 120 and weak. There was dullness over the lower half of both lung fields with dry rales above. Heart was negative. Abdominal examination revealed massive ascites with no organs palpable. There was marked generalized edema with weeping and oozing of the skin. One centimeter nodes were noted in each axilla. The patient was treated with oxygen, Cedilanid, aminophylline and mercurial diuretics. On the day following admission, eight number 18 needles were inserted in the legs with drainage tubes attached. Two centimeter incisions were made in each ankle to promote drainage. Considerable fluid drained from the incisions in the ankles, but the needles soon clogged and stopped draining.

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[*] Presented at the Minnesota Society of Internal Medicine, May 26, 1951.

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The venous pressure taken soon after admission was seven centimeters. Circulation time, arm to lung was 11 seconds, and arm to tongue 15 seconds. Urinalyses showed specific gravities of 1.010 to 1.027. There was no sugar, but at times a faint trace of albumin. Occasional casts and leukocytes were seen. Blood-urea-nitrogen was 14 mg. per cent. Serum proteins were 6.3 grams with 3.7 grams of albumin and 2.6 grams of globulin. PSP showed 35 per cent excretion in one hour. A portable chest x-ray film revealed diffuse cardiac enlargement, marked congestion of the lungs, and bilateral pleural effusion. A week later there was marked clearing of the lung fields and the heart was 18 cm. in diameter which was 64 per cent of the chest diameter.

Despite vigorous therapy, the edema remained massive. Digitalis and mercurial diuretics were continued. Repeated pleural taps removed up to 1,250 cc. of fluid per sitting. Urea and 50 per cent glucose were given with uncertain diuretic effect. Sweating induced by heating pad or pilocarpine produced noticeable weight loss. Subsequent venous pressures were 11 and 7.5 cm. in the face of massive edema. Repeat serum proteins were 4.5, 6.5, and 6.0 grams with normal A-G ratios. After four months, the edema had subsided enough so that she wished to be discharged. Her weight was 130 pounds. She was given digitoxin, Salyrgantheophylline and a salt-free diet.

After discharge, she had repeated visits to the out-patient department as well as several hospital admissions. During the four years of illness she has had 15 admissions to the hospital; 68 visits to cardiac or medical clinic; 52 trips to the receiving room for chest pain or dyspnea usually relieved by narcotics; 25 visits to surgery clinic in regard to plastic repair of the periorbital edema which impaired her field of vision; 15 check-ups in eye-ear-nose-throat clinic because of chronic sinusitis; 12 in dermatology clinic; and four visits to neuropsychiatric clinic because of a peripheral neuritis thought to be caused by pressure from edema.

The patient has had continuous difficulty with persistent edema though, at times, she becomes almost edema-free. With increasing fluid she has had noticeable dyspnea and orthopnea. She has had frequent episodes of precordial, shoulder and arm pain, not relieved by nitroglycerine. Narcotics usually give relief, and narcotic and even alcoholic addiction has been suspected. She has frequently been intoxicated when seen in the emergency room. She has had arthralgia which has been of minimal degree.

On physical examination the blood pressure has varied from 100 to 130 systolic, over 70 to 90 diastolic. Pulse has been 70 to 110, always regular. Her skin has shown a red-brown V-shaped area of pigmentation of the chest. Palmer erythema has been present. The edema, which usually pits, has been present over the whole body, but especially in the ankles and suborbitally where brownish pigmentation also developed. The fundi have been negative. Thyroid has not been enlarged. No further adenopathy has been noted. Lungs have shown basilar and diffuse rales, and occasionally signs of pleural fluid. Heart has been regular. Tones have been soft. No murmurs other than an intermittent, soft, apical systolic have been heard. The abdomen has, at times, shown ascites, and at times hepatomegaly, three or four centimeters below the costal margin.

The laboratory has been of little help in establishing a diagnosis. Hemoglobin has varied from 12 to 15 grams; white blood count from 7,000 to 19,000, usually about 10,000, with 58 to 88 per cent polymorphonuclears and zero to 4 per cent eosinophils; sedimentation rate has been 2 to 25 mm.; Wassermann has been negative; agglutinins have been negative; blood-urea-nitrogen 14 to 22 mg. per cent; serum proteins and liver function tests have been normal.

Initially, the electrocardiogram showed low QRS, right axis shift, and absent R waves in Cfl through six. Later the ventricular voltage returned to normal limits. First degree heart block was at times present while on digitalis. The present cardiogram shows R waves in V_5 and V_6, and is considered a normal cardiogram in the vertical heart with clockwise rotation. After her first admission, the chest x-rays showed a decrease in cardiac size to 50 per cent of the chest diameter. Minimal congestion and old pleural changes are present.

Bone marrow was normal. Axillary node biopsy showed simple hyperplasia. Three skin biopsies showed a few chronic inflammatory cells around the vessels. Muscle biopsy revealed a chronic inflammatory infiltration of the vessel walls. Microscopic examination of the suborbital tissue removed surgically demonstrated normal epithelium, markedly edematous subcutaneous tissue, and definite perivascular infiltration.

The cause of this patient's edema has remained in doubt. Cardiac decompensation has been considered, but the absence of demonstrable heart disease and normal venous pressure are against this diagnosis. Nephrosis and other kidney disorders seem unlikely with normal renal function. Scleredema seems a possibility, but the dermatologists tell us that the edema of scleredema should not pit. Other collagen diseases, possibly with cardiac involvement, have been considered but appear less likely.

In January 1951 the patient received 50 milligrams of ACTH daily for two weeks. She claimed a subjective improvement in that her skin felt "less tight." However, more edema developed despite a salt-free diet. She gained six pounds during this period. ACTH was stopped and the edema subsided under management with diuretics.

Erythema Multiforme Exudativum

Stevens-Johnson's Disease

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A five-year-old white female was admitted to the Minneapolis General Hospital on January 3, 1951 and expired February 4, 1951, the thirty-third hospital day.

For two weeks prior to admission, the child had an upper respiratory infection with malaise and aching bones. Just four days prior to admission she developed a slight red rash about the eyes and some linear erythematous lesions on the trunk. Two days later, her temperature was noted to be 104° (oral) and she was given a prescription for a sulfonamide by her physician. Following this her temperature remained elevated and she was lethargic.

Past history revealed that she had always been a small child and had difficulty keeping up with other children. She had frequent styes which had been treated with yellow oxide and penicillin ointment. During the second, third and fourth years the child had painful, swollen, red knee joints associated with fever and malaise. During these episodes she would be ill for about two weeks and then seem to recover completely.

Physical examination on admission revealed a small child who appeared both acutely and chronically ill. Her temperature was 103.8° (oral) and her pulse was 120 per minute. Both tympanic membranes were injected. The lips were dry and cracked. The pharynx was moderately injected. There was a purplish discoloration about the eyes and a linear multiforme erythematous rash was present on the extremities and the trunk. The heart, lungs, abdomen, and general neurological examination were within normal limits.

Laboratory examination on admission revealed normal urinalysis. The hemoglobin was 14.8 grams and the leucocyte count was 5,100 with 70 per cent polymorphonuclears, 29 per cent lymphocytes, and 1 per cent monocytes. The sedimentation rate was 30 mm. in 60 minutes. Nose and throat cultures were negative for diphtheria and hemolytic streptococcus. An x-ray film of the chest was normal, and the electrocardiogram was also normal. The Mantoux 1:1000 was negative and the serology was negative.

The child was started on penicillin 100,000 units every eight hours because of the otitis media and the pharyngitis. She was also given the usual vitamins. Her fever dropped rapidly to between 100-101° and seemed to stabilize there for the remainder of her hospital course. The upper respiratory infection cleared very slowly.

On the fourth hospital day it was noted that the child complained of a sore mouth when eating, there were grayish membranous lesions present on her buccal mucosa, and the conjunctivae of her eyes were injected. The leucocyte count remained low. The blood mucoprotein was 10.3 mg. per cent, which was well above the normal of 2 to 3 mg. per cent. A peripheral blood smear was examined for lupus erythematosus cells but none were found.

On the ninth hospital day a pseudomonas organism was cultured from the urine. The following day puffiness was noted about the eyes. The skin and mucous membrane remained essentially the same. Two days later the eyes became very edematous and saline packs to the eyes were started. The penicillin was discontinued and aureomycin 250 mg. every eight hours was administered. At this time bullus lesions were first noted in both axillae and the labia majorae were erythematous. The child complained of her hands hurting.

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Corneal scrapings of the eyes were negative for inclusion bodies, but a culture of the conjunctival sac revealed a coagulase positive staphylococcus aureus. Examination of the bone marrow was normal.

By the sixteenth hospital day, her eyes were much worse. Lid edema was marked and there was considerable exudate present in the conjunctival sac. The child was unable to open her eyes enough to see. Bullus lesions over the dorsum of her hands were likewise present. Since she was definitely going downhill and her eyes were in serious danger, it was felt that ACTH (adrenocorticotropic hormone) should be tried. Twenty mg. of ACTH were given every six hours intramuscularly and topical cortisone was placed in the eyes. The cortisone was continued for only two days because the eyes improved so markedly. The skin lesions however remained about the same. The ACTH was decreased on the twenty-second hospital day to 10 mg. every six hours. The blood mucoprotein was repeated and found to be further elevated to 13.1 mg. per cent; this was thought to represent continued activity. The child, however, continued to improve clinically over the next seven days.

Four days before her death on the twenty-ninth hospital day, the child was lethargic and complained of increased urinary frequency. Examination at this time revealed moderate edema of the upper lip and mild abdominal distension. There was no abdominal tenderness and bowel sounds were present and normal. The skin lesions were healing well and the eyes were essentially free of any pathology. X-ray films of the chest and of the abdomen were normal. A urine culture showed that proteus organisms were present, and so Chloromycetin was started. The ACTH was decreased at this time to 10 mg. every 12 hours. Three days later the left hand was edematous and the child complained of abdominal pain. There was mild abdominal distension and several new bullus lesions were noted on the trunk. The following morning the child was found in a clonic convulsive seizure which involved the upper extremities. Intravenous amytal and oxygen controlled the seizure but she did not respond to stimuli. Two hours later generalized convulsive movements were again noted and her temperature had risen to 105° rectally. Tepid sponges and Amytal controlled the seizure and she seemed much improved for a short time. Suddenly she developed shock and expired within a few minutes. Permission for postmortem examination could not be obtained.

The clinical diagnosis was erythema multiforme exudativum (Stevens-Johnson's disease).

DISCUSSION

Clinically this case falls into the syndrome of erythema multiforme exudativum described by Von Hebra in 1866. This syndrome is popularly referred to as Stevens-Johnson's disease, but most authors feel that the cases which were described by Stevens and Johnson[1] are the more serious types with severe ocular involvement. This disease is an acute illness which is manifested by a cutaneous eruption which may be either erythemato-papular or vesico-bullus, mucous membrane involvement, a protracted course lasting two to eight weeks, a tendency to recurrence (approximately 17 per cent), and is found predominantly in the younger age group.[2,4] There may be predominance of either skin or mucous membrane lesions, but usually both occur. The prognosis is usually determined by the extent of ocular involvement, which may be very serious as stressed by Stevens and Johnson[1] and Bailey.[3] The mortality is about 5 per cent and death is usually caused by secondary infection.

The cutaneous lesions may be mild or severe. The erythemato-papular lesions tend to occur in the milder cases and are seen on the extensor surfaces and the dorsum of the hands. The vesico-bullus lesions are thought to represent further activity. Hemorrhages may occur in the bullus type and pigmentation for several weeks following desquamation is frequently seen. An edematous infiltration may occur in face, lips, hands, and legs.

The mucous membrane lesions are very common and may occur without any cutaneous involvement. Involvement of the eyes is seen most frequently, but tracheobronchial, oral, and genital lesions are also seen. The eyes are involved in about 70 per cent of the cases. There may be any degree of involvement from simple conjunctivitis to panophthalmitis. The oral lesions start as papules which rapidly become vesicles or bullae and later have a pseudo-membrane which heals in one to two weeks. An associated pneumonia is seen in approximately 50 per cent of cases and it is felt that this is part of the clinical picture and due to involvement of the bronchial mucous membrane.[5] The genital lesions vary from mild erosion of the meatus to severe membranous formation.

The case presented fits the clinical syndrome of erythema multiforme exudativum. The illness was acute and cutaneous lesions of both papular and bullus types were present. There was involvement of the eyes, buccal membranes and lips, and the genitalia. The course was protracted and influenced little by antibiotics. The involvement of the eyes seemed to respond to the ACTH and Cortisone, but there was little improvement in the cutaneous manifestations while on ACTH. The marked elevation of the mucoprotein is interesting and probably represents diffuse tissue destruction. It also suggests a possible relation to the collagen type of diseases.[6]

It was unfortunate that a postmortem examination could not be obtained as the exact cause of death is not known. An overwhelming septicemia would seem to be the most likely cause of death. However, since the child did complain of abdominal pain and distension 12 hours before she expired, the possibility of a perforated ulcer and subsequent peritonitis would have to be considered. The recent reports[7,8] of activation and perforation of ulcers in the gastrointestinal tract while on ACTH therapy and the apparent masking of symptoms by the ACTH would suggest the latter cause. There have been lesions in the mucous membrane of the gastrointestinal tract reported in this syndrome.

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Clinicopathological Conference*

Minneapolis Veterans Hospital

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PRESENTATION OF CASE

First Admission: A 54-year-old farmer was admitted to the neurological service on August 23, 1947. Twenty-four hours before admission he suddenly developed nausea and weakness. Shortly thereafter he was unable to speak and his right arm and leg became paralyzed. His local physician examined the patient and referred him to this hospital.

He had complained of headaches for six months. He denied hypertension. Two sisters and one brother had heart disease.

Physical examination showed a lethargic man with expressive aphasia. He had paralysis with increased reflexes of the right arm and leg. The remainder of the examination was negative. The temperature was 99.8° F., the pulse rate 76 per minute and the blood pressure 108 mm. Hg systolic and 80 diastolic.

The hemoglobin was 16.7 gm. per 100 ml., and the white blood cell 15,600 per mm.^{3} with 83 per cent neutrophils, 15 per cent lymphocytes, 1 per cent monocytes, and 1 per cent eosinophils. Urinalysis, blood Kahn, and spinal fluid examinations were negative. X-ray films of the chest and skull were normal.

He gradually improved with partial recovery of speech and decrease in paralysis. He was able to walk with a cane when he was discharged on February 21, 1948.

Second admission (11:55 P.M., May 27, 1951): The history was obtained from his wife. He remained at home and evidently regressed so that he was unable to speak and had hemiplegia of the right arm and leg which forced him to lead a bed-chair existence. He was otherwise well until three weeks prior to admission. It was thought that his abdomen then began increasing in size and he developed urinary frequency.

The evening of May 25, 1951 he developed severe generalized abdominal pain, vomited once and became restless. A physician was summoned who found normal bowel sounds, no abdominal tenderness, blood pressure of 80 mm. Hg systolic and 60 diastolic and weak pulse. A urinary antiseptic was prescribed. The following day the patient had further abdominal distension, continuous low abdominal and mid-back pain, no urine output, and restlessness.

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*Published with approval of Chief Medical Director. The statements and conclusions published by the authors are the result of their own study and do not necessarily reflect the opinion or policy of the Veterans Administration.

At 2:00 A.M. on May 27 he became more restless and began to have diarrhea with bright red bloody stools every 15 minutes. He also had several episodes of nausea and vomiting. The diarrhea stopped by 2:00 P.M. on May 27, when he was again seen by his physician. The lower abdomen was now tender and no bowel sounds were heard. The blood pressure was 100 mm. Hg systolic and 60 diastolic. Catheterization performed with a guide yielded no urine. He was given a hypodermic injection and referred to this hospital.

Physical examination revealed a pale aphasic man with cold clammy skin. He was conscious and cooperative. Right hemiplegia with ankle clonus and positive Babinski on the same side were noted. The heart sounds were faint. The abdomen was tense and moderately tender in the lower portion. There was no rebound tenderness or spasm. An ill-defined tender doughy mass filled the abdomen to a point a few centimeters above the umbilicus. An occasional peristaltic sound was heard but there were no rushes. Rectal examination revealed a boggy mass superior to a normal prostate and mahogany colored material on the examining finger.

The temperature was 100° F. rectally, the pulse rate was 130 per minute and the blood pressure could not be obtained.

An admission hemogram showed a hemoglobin of 17.8 gm. per 100 ml., and a white blood cell count of 19,900 per mm.^{3} with 82 per cent neutrophils and 18 per cent lymphocytes. The sedimentation rate was 7 mm. in one hour and the hematocrit was 56 per cent. No urine could be obtained at the time of admission. Fourteen hours later the urine showed an acid reaction, a trace of albumin, a trace of acetone, a one-plus test for reducing substances, and 100 red blood cells per highpower field. The blood urea nitrogen was 30 mg. per 100 ml., the chlorides 102.6 MEq per liter, the CO_2 15.8 MEq per liter, the potassium 4.52 MEq per liter, the serum amylase 40 units, and the blood sugar 416 mg. per 100 ml.

X-ray films of the chest showed some bilateral basilar atelectasis with high diaphragms. X-ray films of the abdomen in the upright and supine positions showed no free gas beneath the diaphragms. The stomach was slightly distended. There was diffuse haziness over the entire abdomen. Several loops of small bowel distended with gas were visible on the right side of the abdomen. A gas and fluid level was seen in the right upper quadrant. An intravenous pyelogram showed that the kidney shadows were well outlined and appeared to be somewhat small. There was a progressive increase in density of the renal shadows but the dye was not excreted sufficiently to outline the drainage system.

A catheter could not be passed beyond the vesical neck even with the aid of a guide. No urine was obtained by suprapubic aspirations, but on May 28 after restoration of his blood pressure he passed a few milliliters of urine.

Following several transfusions of blood and plasma and 12 hours after admission his blood pressure could first be obtained and was 128 mm. Hg systolic and 84 diastolic. He remained acutely ill and except for the change in blood pressure there was no improvement.

Twenty hours after admission an operation was performed.

DISCUSSION

DR. ROBERT GREEN*: May we see the x-ray films?

DR. STERNS: In addition to the x-ray studies described in the protocol a urethrogram was done. I see no reason why they were unable to catheterize him except that his bladder was small. What they thought was an obstruction at the vesical neck was an obstruction at the top of the bladder.

The intravenous pyelogram shows the kidneys densely outlined by contrast media with very little dye in the drainage system.

The remainder of the x-ray studies are as described in the protocol.

DR. GREEN: I think we are dealing primarily with a disturbance of the gastrointestinal tract and I am going to base my discussion largely on that hypothesis. The initial admission for this patient can probably be discussed with a few comments. It seems to me to be a fairly clear-cut cerebral vascular accident; probably a thrombosis in the absence of any blood in the spinal fluid to suggest a hemorrhage, and in the absence of any other findings to suggest that there might have been an embolus from the heart. The heart was normal. There was no auricular fibrillation, or reason to think that there may have been auricular thrombi which may have given origin to an embolus to the brain. So I think this first episode back in 1947 would most likely represent an episode of cerebral thrombosis involving the left side of the brain with a right hemiplegia and an expressive aphasia.

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*Instructor in medicine, University of Minnesota, and internist at the St. Louis Park Medical Center.

The interval history doesn't contribute much to the events that follow.

I might just comment briefly on some of the symptoms which suggest most strongly some type of intestinal obstruction. Subsequent events tend to make one think that this falls into the strangulation type of intestinal obstruction. Symptoms that were initially present could be consistent with several types of obstruction. Abdominal pain, vomiting, and obvious shock are all consistent with that idea. He develops further abdominal distention with pain. The back pain is of some interest because it occurs rather frequently in patients with intestinal obstruction; particularly of a strangulation type, where there is a good deal of exudation into the bowel causing a drag on the root of the mesentery. I don't believe we have to assume that this represents pancreatitis or any such process as that.

I cannot definitely state what the mass in the abdomen is. I presume it is probably bowel that is palpated as a mass. It seems to me in those first films there was a rather broad fluid level in the small bowel. I believe there was some small bowel obstruction in that area.

He showed the laboratory data indicating fair degree of hemoconcentration. The leukocytosis would be consistent with that plus peritoneal irritation. It is a little curious at this point to find a blood sugar of 416 and a very small amount of sugar in the urine. This probably indicates that this man was a diabetic and there simply had not been enough excretion of urine for much glycosuria to be present. The red cells in the urine are likely due to trauma incident to his catheterization. A low serum amylase doesn't exclude pancreatitis but it makes it unlikely.

The only other comment on the findings is that the failure to obtain urine by catheterization is a result of the combination of shock plus a small contracted bladder. The bladder situation doesn't seem to have too much to do with the episode for which he was admitted and which we are primarily discussing here. An operation was then performed, and I am sure this was not a transurethral resection but a laparotomy.

My diagnosis at this point would be that this patient had suffered some type of mesenteric vascular occlusion. A mesenteric vascular occlusion can be either a thrombosis or embolus. The thrombosis may involve either the arterial or the venous side. Occlusive disease is more common on the arterial side than it is on the venous side. The ratio is about 3 to 2. The commonest occlusive process is an embolus to the superior mesenteric artery. Any of the vessels may be involved but the commonest either by embolization or by thrombosis is the superior mesenteric. Therefore, I think it is likely this man has had some type of occlusion of the superior mesenteric artery.

On the basis of frequency one might think it was an embolus, but there is no evidence to suggest embolization from the heart from a mural thrombus. One could conjecture that there had been an embolus from an aortic mural thrombus that was dislodged and traveled to the superior mesenteric artery. That occurs occasionally. Many of us have seen cases of embolus of the superior mesenteric artery where no mural cardiac thrombi were found, but where there has been a shaggy ulcerated aortic wall with thrombi on the wall.

The symptoms suggest bowel obstruction. The symptoms of mesenteric vascular occlusion can vary rather widely. They may run a course of several days with mild symptoms before a severe episode occurs; or it may occur as a dramatic acute episode with severe abdominal pain followed by bloody diarrhea. In mesenteric vascular occlusion an appreciable percentage have no melena. About 20 per cent of the cases develop bloody diarrhea with occlusion of one of the mesenteric arteries. The nature of the pain would be entirely consistent with vascular occlusion.

The tumor mass is hard to explain. A tumor mass is present in a small percentage of cases of thrombosis of the mesenteric vessels. Of course, it is more common in other types of obstructive diseases of the bowel; but the presence of a mass doesn't exclude this diagnosis in any sense. So far as distention is concerned, one may have almost anything in vascular obstruction. You can have extreme obstruction with a large amount of gas and fluid in the small intestine or gas in both the large and small intestines. The fact that this patient did not develop much in the way of distention and abnormal bowel sounds early in the course is quite consistent with the disease I am describing. The absence of bowel sounds later is a manifestation of paralytic ileus with exudation of fluid through the bowel and is a rather common finding.

It is a little hard to decide just what type of mesenteric processes occurred here, but a thrombosis of the superior mesenteric artery with infarction of the bowel is indicated. The other things certainly have to be taken into consideration. Mesenteric venous thrombosis can occur with infarction of the bowel. It can occur as a more or less idiopathic event without preceding appendicitis or other inflammatory disease. Usually with the thrombosis on the venous side there is some type of infectious process in the peritoneal cavity that initiates thrombosis in the vein. I do not think there is much to support this.

Of the other things to be considered, the principal differential problem is intussusception. The same sequence of events could occur except that later in the course of the disease one would expect more in the way of distention unless the intussusception had been relieved. Bowel sounds are usually much more prominent with intestinal rushes. A mass is more common and usually it is a smaller, more discrete mass. The presence of the bloody diarrhea would be consistent with the diagnosis of intussusception. I think there are more reasons to suspect that it was not intussusception than to suspect it was. A Meckel's diverticulum can cause intussusception. The commonest cause is benign tumors in the distal ileum or in the cecum. I really don't believe that was what this patient had.

The other process which one might consider is a torsion type of obstruction with interference of the blood supply. Volvulus of the colon is not a common disease. The same sequence of events occurs with volvulus as with intussusception. The reasons for thinking it is probably not volvulus are much the same as those that make intussusception unlikely.

There is just one other thing I would like to call attention to. That is the somewhat increased tendency for thrombosis in patients with polycythemia vera. This man did not have polycythemia vera although he had a rather high hemoglobin and rather high hematocrit. In patients with polycythemia vera a mesenteric thrombosis is not an uncommon event. The final diagnoses I make here are: superior mesenteric artery thrombosis with infarction of small bowel; generalized arteriosclerosis, and probable diabetes mellitus.

DR. BELL: Do you think diabetes would have anything to do with this?

DR. GREEN: I think that the tendency towards advanced arterial disease might be related to mesenteric thrombosis. I doubt that he had pancreatitis and developed hyperglycemia as a consequence.

A RESIDENT: The bowel might have been perforated as a result of his infarction. An accumulation of exudation and blood in the cul-de-sac might be the explanation for the rectal mass.

DR. GREEN: It is possible. It is more likely edematous bowel that is being felt there.

A RESIDENT: I would like to ask Dr. Heller if a blood sugar of 416 could be produced by a pancreatitis?

DR. HELLER: Yes, it certainly could. You can get severe hyperglycemia with acute pancreatitis.

DR. EBERT: What is the explanation for the fact that the kidneys are shown so well on the pyelogram?

DR. BELL: Perhaps it is tubular excretion of the dye with no production of urine. He has a very low filtration rate and the dye doesn't get any further than the kidneys.

DR. HELLER: It is quite obvious that with this degree of shock the renal blood flow must be very low. I do not understand how his Tm for the dye would be high in the presence of low renal blood flow. You can't explain it on the basis that his tubules are still functioning when he is not filtering urine very well. I think you can say with the blood pressure 80/60 and with the patient anuric that the renal blood flow is very low. There is not much dye coming to those kidneys. How he can excrete it that well, I don't understand.

DR. HAMMARSTEN: The students today had a variety of diagnoses. Two of them agreed with Dr. Green. Two of them thought the patient had diabetes and generalized arteriosclerosis and thought that somehow explained everything. Two thought the patient had polycythemia vera. Another thought the patient had a hypernephroma, and the eighth man elected polyarteritis nodosa.

DIAGNOSES

Clinical diagnosis: Volvulus? Mesenteric vascular occlusion?

Dr. Green's diagnosis: Thrombosis of the superior mesenteric artery with infarction of the small bowel. Generalized arteriosclerosis. Diabetes, mellitus, probable.

Anatomical diagnosis: Thrombosis of the superior mesenteric artery or vein, or both, with infarction of the small bowel. Diabetes mellitus. Cerebral arteriosclerosis.

PATHOLOGICAL DISCUSSION

DR. GLEASON: At operation the small bowel was infarcted from the ligament of Treitz down to 38 cm. from the ileocecal valve. The infarcted bowel was resected.

Postoperatively the patient improved. On

June 7 his potassium was 2.9 MEq per liter and supplemental potassium was given.

On June 8 the patient became acutely ill. His blood pressure was unobtainable and he died despite transfusions.

At autopsy there was another area of infarction distal to the line of anastomosis. There were thrombi in both the superior mesenteric artery and vein. Which came first, we cannot say. There was moderate arteriosclerosis of the aorta. The heart was normal. There was cerebral arteriosclerosis.

The pancreas showed numerous hyalinized islets. Almost all the islets we found contained hyalin material.

DR. BELL: Evidently this represents a very mild case of diabetes with a severe degree of hyalin degeneration in the islets. There is no connection between the severity of the diabetes and the severity of the hyalin changes.

DR. EBERT: Are the hyalin islets pathognomonic of diabetes?

DR. BELL: Yes.

DR. GREEN: Mesenteric thrombosis is a disease that usually isn't recognized and operated early. A review of the recent literature on mesenteric vascular occlusion indicated that the disease is frequently overlooked and the patients are subjected to surgery too late, after much of the bowel is infarcted and the patient's general condition is poor.

DR. EBERT: I think one of the reasons for that, Dr. Green, is that the patient develops rigidity of the abdomen late and ordinarily we think rigidity is synonymous with acute surgical diseases of the abdomen.

Meet Our Contributors . . .

JOHN FRANCIS BRIGGS was graduated from the University of Minnesota medical school in 1928, specializes in internal medicine in St. Paul, where he is a staff member of St. Joseph's and St. Luke's hospitals and chief of staff of Ancker hospital.

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JOHN P. WENDLAND was graduated from the University of Nebraska medical school in 1941, practices ophthalmology in Minneapolis, serves as instructor in ophthalmology at the University of Minnesota. He is on the staffs of Northwestern, Abbott, and Minneapolis Veterans hospitals.

This is the fifth in a series of letters to Dr. J. A. Myers and the readers of the Journal-Lancet *from Dr. Ancel Keys, director of the laboratory of physiological hygiene at the University of Minnesota, during a year of study and travel abroad. Other letters will follow in subsequent issues.*

Notes from a Medical Journey

12 February 1952, Naples, Italy

Dear Jay:

This letter was started in Aberdeen and I tried to finish it in Rheims but, as you see, here we are in Naples and the letter is still not done. At the moment, I am typing this in the laboratory which the Istituto di Fisiologia has prepared for our use; Margaret is running some trials of the cholesterol method a few feet away and there are three Italian doctors leaning over her shoulder to see the procedure. Tomorrow we are to have our first Italian subjects, so there is much work to make sure all is ready for them.

In the past three weeks we have covered a lot of ground. It all began on the 23rd of January when I gave a lecture at Oxford and then dashed off to London for a few conferences before leaving for Scotland. Our Scottish friends arranged to make us feel at home by treating us to Minnesota weather; when we stepped off the Flying Scotsman at Edinburgh in the morning it seemed like a January blizzard at home. And the next day the local newspapers made much of the fact that we were experiencing the coldest weather since 1872 -- thirty degrees of frost. It did seem a bit chilly sitting on the train first to Stirling and then to Aberdeen, with no heat at all. For this there were offered several explanations. Why bother about heat for the run to Stirling of only an hour and a half? And from Stirling to Aberdeen (four hours) we traveled on Sunday when it is not customary to provide heat in the Scottish trains, we are told. Finally, I don't think there was much choice about the provision of heat because the steam pipes were frozen.

In Edinburgh, Dr. A. P. Meicklejohn kept us warm by rushing us about at a tremendous pace with refreshments at every pause; Margaret counted eight occasions for coffee, tea, cakes, etc., on the way to my first afternoon lecture. At Stirling, Dr. Magnus Pyke whisked us off to spend the night at his home and at Aberdeen, Professor and Mrs. Dugald Baird met us at the station with an honest-to-goodness warm car. We stayed in Dr. Isabella Leitch's home in Aberdeen where the profusion of coal fires, electric heaters and hot water bottles (four of the latter) made us forget the chill we had accumulated in Oxford and on the trip. By the time we got to Glasgow, Professor R. C. Garry's beds with "stane piggies," plus hot water bottles, were almost too warm for our thick blood.

In the meantime, I delivered the Macarthur Postgraduate lecture for the Edinburgh Medical faculty (on cholesterol and coronary disease) and another for the School of Public Health (on the Minnesota Experiment). At Aberdeen and at Glasgow I lectured on different aspects of the composition of the body and managed to use one of the latter lectures for a repeat performance at Strasbourg a few days later. I am glad I have no lectures scheduled for here in Italy.

Anyway, we are having a grand time, even though impressions of people and places are blurred by the speed of transit. Edinburgh's Castle and other external glories were but dimly visible through the snow and I could not really sort out all the people whom "Peter" Meicklejohn arranged for us to see. Edinburgh is a big school, with two hundred medical students in a class, a twelve-hundred bed teaching hospital, and a great air of activity about. Every second person is writing a book -- Professor Stanley Davidson and colleagues in the department of medicine have four books in preparation, one being a new general textbook of medicine.

At Edinburgh several of the departments are engaged in active programs of research on coronary disease. And there, as in the United States, they find that their coronary patients are differentiated from the clinically healthy controls by a distinct tendency towards elevated levels of cholesterol in the serum.

At Aberdeen the stay with Dr. Leitch provided opportunities for good talk. Before her long association with Lord Boyd Orr, Dr. Leitch worked for several years in Copenhagen and we had a fine time exchanging reminiscences of August Krogh who will always be, for both of us, the Professor. She saw the beginnings (1915-1919) of Krogh's great work on the capillaries and I saw its tag ends (1930-1931). At Aberdeen I was impressed by the work of Professor Dugald Baird, Dr. Angus Thompson, and their associates on the problems of pregnancy, childbirth, and infant health. To my way of thinking, this is an outstanding example of research in what I call physiological hygiene; using the resources, in this case, of the obstetrician, the physiologist, the public health worker and other specialists in a joint effort -- which is a lot more than mere cooperation -- to discover the factors and their interplay in the health problems of pregnancy and its fruit. Anyway, Aberdeen, which seems rather remote, is showing the way in several fields of research.

We were sorry to have only a night and less than one day in Glasgow, particularly as Professor Garry's department of physiology is one of the few places in Britain where physiological experiments on man are actively prosecuted; Cathcart's influence is still evident. But we had to hurry on back to Oxford to get our car and start on the southern trip which brought us to Naples. After a hectic eighteen hours in Oxford we were packed and racing for the night auto ferry from Dover to Dunkerque.

The wide, straight roads of France were a relief after the winding lanes of England, but we could not make very good time because all of that part of the world was blanketed in snow; anyway, the little Hillman is not built to cruise at seventy miles an hour. Still, the sun came out to show us the Cathedral at Reims, and a magnificent dinner, with a bottle of champagne "nature" (Blanc de Blanc, Cramant, not sparkling and very dry) eased the strain of driving on icy roads. And so on to Strasbourg where my former student, Dr. Bernard Metz, had arranged a lecture and an endless series of elegant meals -- of which we ate too much, to the detriment of our digestive apparatus. The Alsatians are a happy blend of German and French in customs but, politically, they have no use for Germany; for that matter, they seem to feel a little distant about the France of Paris.

The Medical School of the University of Strasbourg continues to be outstanding, as it has for many years, and it was exciting to visit department after department and find the staff keen and the facilities good, with the unifying spirit of research pervading the whole place. Dr. Metz is doing nice work on diurnal rhythms in man and there is every prospect that he and his colleagues will develop an outstanding center for human (sic!) physiology. In the department of medicine I was most interested to see excellent studies in progress on cirrhosis of the liver. Among the reasons for my delight was the fact they have been able to show that the old simple Starling theory of edema formation does not explain the edema of cirrhosis any more than it does that of starvation. On this score, no one quarrels with me any more, though it was only about five years ago that most of my colleagues were either scornful or downright disbelieving when I challenged the theory on the basis of our findings in the starvation studies.

Reluctantly, we had to leave Strasbourg in another snowstorm and head for the Alps with much misgiving. It was a tough drive until we crossed over to the Swiss side where snow clearance is as well organized as in Minnesota. Even so, we were glad to roll the Hillman onto a flat car for the trip by rail through the Simplon tunnel into Italy. At the border I was worried about getting in with the apparatus -- including an Evelyn photoelectric colorimeter -- but after an hour's palaver and inspection of the whole briefcase of documents, letters, affidavits, bonds, and "Carnet" I had to support my plea, they let us go Scot-free and off we went roaring through the countryside with the horn in constant action, all in the best Italian manner. With some persuasion, the Hillman got up to seventy and then a succession of Italian cars screamed by as though we were backing up.

So here we are, more than a little bewildered and tired. The arrangements seem excellent and I hope to report our progress in my next letter. Vesuvius and the Sorrento peninsula are white with snow but the Bay sparkles and this crowded city is bathed in warm Italian sunshine.

With all best wishes,

As ever,

Ancel Keys

Lancet Editorial

A Personal Tribute to Jacob G. Cohen

Senior Publisher of THE JOURNAL-LANCET

ON my first meeting J. G. Cohen some thirty years ago, he expressed a desire to devote his life to the betterment of human health. He had been graduated from the University of Minnesota in 1920 with a major in chemistry and had taken several other subjects of great advantage to a health worker. At that time he visualized one or more journals through which the public could become better informed on health. It was also his hope that professional publications might be developed for dentists and physicians.

From 1926 to 1929 he published *Popular Health Magazine*, consisting of excellent articles by physicians and others on a wide variety of health subjects. From this, he organized a group of Minneapolis physicians, representing nearly all the specialties as well as general practice, with the idea of producing material for a national syndicated health column. Each of these physicians prepared six articles in his respective field which were designed to convey health information to the public. The *Chicago Tribune* syndicate was sufficiently interested to send a representative to meet with this group. He was convinced that the series of articles had much merit but that each one would have to appear over its author's signature. Inasmuch as it was then considered unethical for physicians in private practice to publish signed articles or permit their names to appear in newspapers, the group decided to present the articles to Mr. Cohen for publication in *Popular Health Magazine*.

In 1922, Mr. Cohen became interested in the idea of publishing a medical journal available to all physicians, composed of abstracts of current articles of medical literature, condensed to include only salient points. In addition, each issue was to contain one or two leading articles on practical subjects by nationally known physicians. This journal, under the name, *Modern Medicine*, has since been mailed regularly to every physician in the United States. Dr. Walter C. Alvarez is editor-in-chief.

In 1929, when the editor and publisher of THE JOURNAL-LANCET reached retirement age, Mr. Cohen purchased the journal and requested that a medical editorial board be organized. This journal has since functioned effectively in the interest of medicine in the Upper Midwest. From the publishing offices of THE JOURNAL-LANCET there have since emerged two new journals under Mr. Cohen's guidance, *Geriatrics* in 1945 and *Neurology* in 1951. *Geriatrics* is the official publication of the American Geriatrics Society and is of great value to all physicians in the medical problems of old age. *Neurology* is the official publication of The American Academy of Neurology and is under the editorship of Russell N. DeJong.

In 1946, Jack Cohen established *Postgraduate Medicine*, designed for the continuing education of the practicing physician. Each issue contains a large number of articles on a wide variety of subjects by qualified specialists and general practitioners. Dr. Charles W. Mayo is editor-in-chief and Dr. Morris Fishbein, contributing editor and editorial writer.

Jack Cohen was one of the principal founders of Mount Sinai Hospital in Minneapolis and devoted a great deal of time to procuring and promoting this institution. He was director and former president of the Jewish Family and Children's Service and a member of the board of trustees of Temple Israel, the board of the Federation for Jewish Service, the board of governors of Mount Sinai Hospital Association, and the executive board of Minneapolis Round Table of the National Conference of Christians and Jews. He was a member of the Twin City Chapter of the American Friends of Hebrew University in Jerusalem, a founder of the Standard Club, a member of the Citizens' Committee on Public Education and a member of the board of Oak Park Home.

His principal hobby was gardening. He procured a large lot adjacent to his beautiful home on the shore of Lake Harriet and converted it to a garden, where he grew choice flowers, including many varieties of roses. This garden was open not only to his friends, but to all who wished to enter. He owned the Country Club Farm and Nursery where he spent many hours in the greenhouse and fields. He served at various times as president of the Minneapolis Men's Garden Club and editor of its official publication. He accepted the sole responsibility for the landscaping of Mount Sinai Hospital grounds and was arranging for rare plants and shrubs at the time of his death.

At every opportunity Jack Cohen and his associates supported medical and dental education through their publications and in many other ways. For example, they established a lectureship at the Medical School of the University of Minnesota and contributed significantly to the medical office of the Continuation Study Center.

It was my good fortune to establish a friendship with Jack Cohen which continued for 30 years. Throughout that time he manifested fine character with high ideals. The promotion of good health was always foremost in his mind and he worked unceasingly to that end. He was generous to a fault, both with time and funds. Although he was an unusually successful business man, his first objective was service. He had set definite goals and had a clear vision of the course necessary to attain them. He was constantly planning far ahead for all of his enterprises. For the past seven years he had been developing plans for a large publication which he intended to make as attractive and comprehensive in the field of health as *Fortune* Magazine is in its domain.

During our years of association he expressed his friendship in many ways, and when the preliminary announcement was made of the First International Congress on Diseases of the Chest to be held in Rome in September 1950, he and his associates urged me to attend and assumed the expense of my entire trip. When an invitation was extended to deliver an address at the Hadassah Medical School of Hebrew University in Jerusalem, Jack Cohen encouraged its acceptance and made provision for the additional journey. This proved to be an exceedingly interesting and valuable experience.

He was a loyal American, having served approximately two years in the Chemical Warfare Division during World War I. His only son, David, enlisted for service in Korea and was killed on August 20, 1951, only ten days after reaching that country. Burial services were held on November 30, and two days later, as he entered his home from an afternoon walk, Jack Cohen suffered a cerebral hemorrhage from which he died, at the age of 62.

In their home, Jack Cohen and his wife, Theresa, displayed the true American spirit. They were especially interested in church, music and art. The welfare of their children was always uppermost in their minds. They had a host of friends in many walks of life who were welcome at all times and most graciously received.

Jack Cohen had prepared himself for a life of usefulness. It can be said truly that he reached his objective by contributing significantly to improvement of health and longer living of his fellow citizens.

J. Arthur Myers, M.D.

BOOK REVIEWS

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Surgery of Peripheral Nerves, by EMIL SELETZ, 1951. Springfield, Illinois: Chas. C Thomas. $10.75.

This is for the most part an atlas of excellent anatomical drawings of the nerves and muscles of the extremities by Jean McConnell. They are so clearly labelled that they can be studied with a minimum of effort. There are also some similar drawings of nerve lesions or nerve sutures and a considerable number of very well reproduced photographs.

The publisher has made this a very attractive, easy to use book. All the illustrations are large, the text is copiously spaced, and sections are headed by large captions.

The content of the text is not remarkably different from other treatises on peripheral nerve injuries. The introduction states that this is based on 2037 peripheral nerve injuries, the majority followed to the point of maximum recovery, yet it does not discuss results.

The illustrations make the book valuable to one who does an occasional nerve suture or for anyone interested in the anatomy of the nerves and muscles of the extremities.

W.T.P.

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History of Medicine in Ireland, by JOHN FLEETWOOD, M.B., D.P.H., 1951. Dublin: The Richview Press. 19 illustrations, 420 pages.

This painstaking history covers its subject from 4000 B.C. to the present, giving a vast array of facts, set down for the most part with a markedly un-Hibernian solemnity, that is, if we except the grave account of how in 1904 two famous Irish hospitals were combined and named for a "foreign queen," Royal Victoria Eye and Ear Hospital.

Dr. Fleetwood writes for the layman but deals with material which can not help interesting doctors. He traces the meager history of pre-historic medicine, taking care to point out that those practitioners before the dawn of history were sometimes right as well as sometimes wrong.

The book treats at length the rise of the various medical schools and institutions in Ireland: Trinity College, Dublin; the Royal College of Physicians; the Royal College of Surgeons; the Dublin School of Midwifery; the Belfast School; the private medical schools; and the National University medical schools and their predecessors. These accounts take us through periods of jealousy, competition and destructive feuds which preceded any orderly system of certification of physicians and surgeons.

Throughout, there is careful recognition of the devoted services of physicians and of laymen. The names of Cunningham, Stokes, Jellett, Colles, Graves, Cheyne and Wilde are among the ones familiar to all with interest in this subject.

The progress of medical education is followed through its struggle for forbidden cadavers, the use of clinical instruction, and the present problem of practical experience for the beginner. There are echoes of the problems of the general practitioner. Commenting on the conspicuous absence of general practitioners from national committees, Dr. Fleetwood quotes the then Ministers for Health, "The general practitioner is, of course, the first and most important line of defense against disease." Dr. Fleetwood adds, "Surely 'the first line of defense' deserves representation on the council of war."

Chapters are devoted to professional societies and profession publications.

The illustrations are well printed and interesting, particularly the facsimilies of pages from books and records of several kinds.

There is a bibliography of 16 pages and an index of almost 20. This book may well take its place in any collection of histories of medicine in the various periods and countries of the world.

C.W. del P.

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Pioneer Doctor, by LEWIS J. MOORMAN, 1951. 251 pages. Norman, Oklahoma: University of Oklahoma Press. $3.75.

When the author of this book was born, physicians had almost no knowledge of the various bacteria responsible for certain diseases. The science of bacteriology was a very new infant. One year before, the bacillus of leprosy had been discovered. No specific biological test was available to aid in the diagnosis of disease. Little was known about endoscopy and the x-ray had not been discovered.

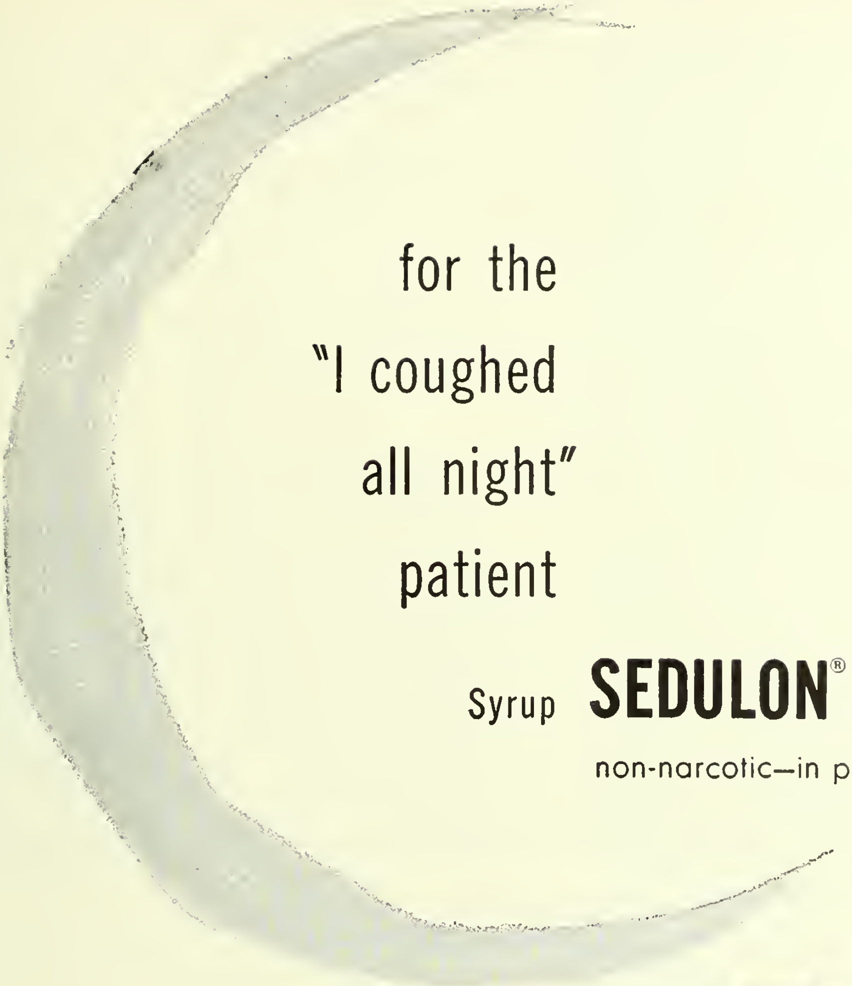
During the author's childhood numerous exciting events occurred, particularly in bacteriology. One bacterium after another was announced as having been proved the specific causes of certain diseases. It was not until he was in medical school that Roentgen announced the discovery of the x-ray and diphtheria and tetanus antitoxin became available. Following graduation more bacteria were to be discovered such as Spirochaeta pallida. Immunizing agents were developed for such diseases as typhoid and diphtheria. The abdomen, the chest, including the heart, and the brain yielded up many of their secrets to the surgeon. Specific drugs were produced for many of the bacterial diseases. During the 76 years this author has lived, far more progress has been made in diagnosis, treatment and prevention of disease than had been accomplished in previous recorded history.

Few physicians are alive today who possess so much information gained from actual experience and who have contributed in so many ways as Dr. Moorman. In this authentic, delightful written volume, *Pioneer Doctor,* is recorded the experiences of one of America's truly great physicians. His fine character and philosophy are revealed throughout.

When Lewis Moorman was a child it was their family physician's "fine character, his high place in the community, his hold upon the hearts of the people, his unselfish devotion to duty, his obvious wisdom and his unchallenged authority" that influenced his decision to go to medical school. He practiced medicine in the country, in small villages, in Indian territory, in a large city, in sanatoriums and in a medical school. He became president of the National Tuberculosis Association, the American Trudeau Society, dean of a medical school, editor of his State medical journal, published excellent articles and books on medical subjects, etc., etc. All of these experiences are woven into this book.

This book is so written that it can be read with profit by physicians, health workers, and all those interested in human welfare.

J.A.M.



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News Briefs . . .

North Dakota

FOURTEEN SENIORS from the two-year University of North Dakota medical course have been accepted for work in advanced medical schools. These include Marlin Krenz, Warren Jensen, Gerald Kavanaugh and Robert Jordheim, who will attend Northwestern University; James Morton, William Byrne, and John Lunseth, who will attend Harvard; Francis Schammel, R. W. Pierson, Barton Slemmons and Roger Sorenson, University of Illinois; James O'Toole, Loyola University; and Arden Anderson and Gerald Rutten, Creighton University.

* * *

DR. H. W. FRENCH of the University of North Dakota medical school was honored on his 78th birthday by the Grand Forks Lions Club for his service to the school which he headed for thirty-seven years.

* * *

THE new $250,000 Community Memorial hospital was opened at Lisbon on February 1. The hospital staff includes Dr. Hans Bakke, Lisbon, chief of staff; Dr. A. K. Lewis, Lisbon, assistant chief; and Dr. S. C. Bacheller, Enderlin, secretary-treasurer. Other staff members are Dr. D. W. Nagle, Enderlin, and Dr. George Haynes and Dr. Abner Veitch, both of Lisbon.

* * *

A RESEARCH GRANT of $2,800 has been awarded by the North Dakota State Medical Center to Dr. Robert G. Fischer to continue his studies on poliomyelitis.

* * *

LYLE LIMOND, Anoka, Minnesota, has been named the new executive secretary of the North Dakota State Medical association. He succeeds E. Forsythe Engebretson, who has resigned to devote full time to law practice. Mr. LiMond, who has been field secretary of the Minnesota State Medical association for the past three years, will make his home in Bismarck.

* * *

NEW PRESIDENT of the Grand Forks District Medical society is Dr. A. C. Kohlmeyer of Larimore. Serving with him are Dr. G. R. Waldren of Cavalier as vice-president, and Dr. A. E. Kulmer of Grand Forks as secretary-treasurer.

* * *

DR. MARTIN P. CONROY of Minot is new president of the Northwest District Medical society. Dr. A. F. Hammargren of Harvey is vice-president and Dr. W. G. Ensign of Minot, secretary-treasurer.

* * *

DR. ROY HORNSTEIN, Rugby, was elected president of the board of health for the North Central District Health unit, at a meeting on January 29. Dr. William R. Fox, Rugby, was appointed district health officer for a term of five years.

* * *

DR. V. A. MULLIGAN of Langdon was appointed county deputy health officer of the Lake Region district health unit. Dr. John C. Fawcett of Devils Lake is district health officer.

* * *

New locations and appointments . . .

DR. OLIVE PITKIN, a graduate of Yale University medical school, will joint the pediatrics department, Northwest Clinic, Minot.

DR. ROMAN KUSHNIR, a graduate of Lemberg university and the University of Erlangen, will establish practice at Wimbledon.

Dr. Joseph H. Clark, formerly of Kendallville, Indiana, has opened practice at Sharon Community hospital.

Dr. G. W. Toomey, Devils Lake, has joined the staff of the Lake Region Clinic in that city.

Dr. I. L. Lazareck, formerly of Langdon, is now associated with Dr. J. H. Mahoney in practice in Devils Lake.

Dr. C. R. Lambert, formerly of Buffalo, South Dakota, has established practice at Bowman.

Dr. Thomas Longmire, Jr., has joined the firm of Glaspel and Johan in Grafton.

Dr. Arthur A. Tait, a graduate of the University of Illinois medical school, and Dr. Arnold L. Lehmann, a graduate of the University of Manitoba medical school, have joined the staff of the Fargo Veterans hospital.

Minnesota

ROBERT B. HOWARD, M.D.

Dr. Robert B. Howard, newly appointed director of the Department of Continuation Medical Education, left Minneapolis on Monday, January 28, for a tour of some of the centers where outstanding work has been done in postgraduate and continuation medical education. In his new post, Dr. Howard succeeds Dr. George N. Aagaard, who took over new duties in January as dean of the Southwestern medical school at Dallas, Texas. Dr. Howard is a member of the board of editors of The Journal-Lancet.

* * *

Dr. O. J. Hagen of Moorhead was honored on January 28 by presentation of the University of Minnesota's outstanding achievement award. Dr. Richard Varco, professor of surgery, and Dr. Howard Horns, assistant dean of the medical school, assisted at the presentation ceremonies.

* * *

Graduates of Minneapolis General hospital's school of nurse anesthetists of the class of 1951 took the highest rating in the United States in recent national board examinations.

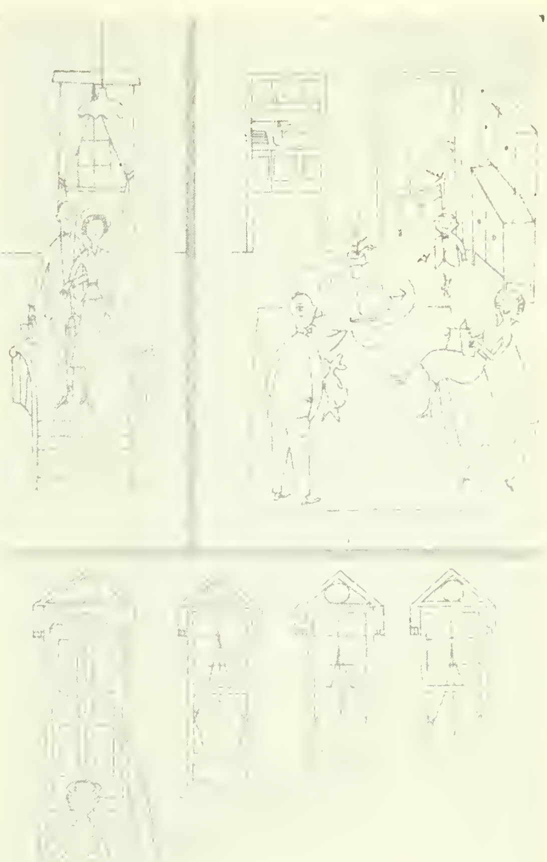
* * *

Dr. Harold S. Diehl, dean of the University of Minnesota college of medical sciences, recently returned from an inspection tour of medical care facilities of the Pacific coast naval district, Pacific command installations in Hawaii, and the USS Repose, a hospital ship assigned to Korean waters.

* * *

Dr. Claude J. Ehrenberg is the newly elected president of the Hennepin County Medical society, and will be installed in his new office next October. Other officers include Dr. Horatio B. Sweetser, Jr., first vice president; Dr. Dale H. Correa, second vice president; Dr. L. Haynes Fowler and Dr. Robert E. Priest, members of the board of directors.

The society has announced that a medical investigation of deaths of babies in Hennepin county during 1952 will be conducted. The study will seek to learn preventable causes, assign responsibility and point out better methods of care. Cooperating in the project are the county medical society, Northwestern Pediatric society,



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Minneapolis Hospital council, and Minneapolis and Minnesota health departments.

* * *

Dr. Henry E. Michelson, Minneapolis, Minnesota, was recently elected an honorary member of the Austrian Dermatological society.

* * *

A number of Minnesota hospitals have announced new staff officers for the coming year. Hospitals and officers include:

Duluth—St. Luke's hospital: Dr. S. H. Boyer, Jr., chief; Dr. Archie Olson, chief of staff-elect; Dr. Karl Emanuel, secretary.

Duluth—St. Mary's hospital: Dr. A. J. Bianco, Sr., chief of medical staff; Dr. R. J. Moe, chief-elect; Dr. I. T. Clark, secretary.

Duluth—Miller Memorial hospital: Dr. J. J. Jeronimus, chief of staff; Dr. Kenneth Teich, vice chief of staff; and Dr. A. C. Kelly, secretary-treasurer. Members of the executive committee are Drs. Earl Barrett, Frederick Becker and Mario Fischer.

Moorhead—St. Ansgar hospital: Dr. James Oliver, president; Dr. V. D. Thysell, vice president; Dr. Carl Simison, Barnesville, secretary.

Little Falls—St. Gabriel's hospital: Dr. E. G. Knight, president; Dr. G. P. Schmitz, Little Falls, vice president; Dr. R. J. Stein, Pierz, secretary.

St. Paul—St. John's hospital: Dr. F. J. Plondke, chief of surgical staff; Dr. Joseph N. Gehlen, chief of medical service; and Dr. Harry C. Ghent, chief of general practice section.

Minneapolis—Glenwood Hills hospital: Dr. Robert Cranston, chief; Dr. Robert Meller, vice president; and Dr. Leslie Caplan, secretary.

Minneapolis—St. Barnabas hospital: Dr. Ames Naslund, chief; Dr. Archie Smith, vice chief; Dr. Harold I. Buchstein, secretary-treasurer.

South Dakota

Dr. F. S. Howe of Deadwood was honored by the community at ceremonies on November 27 for his "generosity of self-service and substance" during his 50-year career as physician and civic leader.

* * *

Dr. J. W. Powell, veteran physician and surgeon of Sisseton, received an award from the Univereity of Kentucky, in recognition of his more than 50 years' practice since graduation. Dr. Powell was graduated from the Kentucky school of medicine in 1901 and has practiced at Sisseton since 1917.

* * *

Dr. Amos C. Michael has joined the staff of the University of South Dakota school of medicine as associate professor of pathology. Dr. Michael is a graduate of Indiana University school of medicine.

Wisconsin

Dr. Harry D. Bouman of the University of Wisconsin medical school is editor of a new medical journal, "American Journal of Physical Medicine." Dr. Bouman received his medical degree from the University of Amsterdam, and has been at the University of Wisconsin since 1947.

Deaths . . .

Dr. Axel E. Hedback, 77, practicing physician for 56 years, medical writer and editor, died December 31 at his home in Minneapolis. Dr. Hedback was editor-emeritus of *Modern Medicine*, editor of *Geriatrics*, and a member of the editorial board of The Journal-Lancet. Born in Sweden, Dr. Hedback came to the United States in 1882 and graduated from the University of Minnesota medical school in 1897. He was physician for Stillwater state prison in 1897, served as chairman of the medical advisory board of the city from 1917, was a member of the Minnesota board of health from 1919 to 1923, served as president of the Hennepin County Medical society in 1928.

* * *

Dr. Douglas F. Robbins, 66, a Minneapolis physician, died January 4 at Minneapolis Veterans hospital. Dr. Robbins was a graduate of Johns Hopkins University medical school and a World War I veteran.

* * *

Dr. Hans Johnson, 71, Kerkhoven physician, died January 20 from injuries suffered in an automobile accident. A graduate of the University of Minnesota medical school in 1904, Dr. Johnson had practiced in Kerkhoven since 1907.

* * *

Dr. N. B. Blochowiak, Rushford physician, was killed January 20, when his car was struck by a train in Winona, Minnesota.

* * *

Dr. Malcolm C. Pfunder, Minneapolis physician and surgeon, died January 23. He had served on the staffs of Swedish, Lutheran Deaconess, Fairview and Mt. Sinai hospitals. He was past president of the Hennepin County Medical society and Minnesota Academy of Ophthalmology and Otolaryngology.

* * *

Dr. George E. Runnerstrom, 59, former Minneapolis physician and Veterans hospital staff member, died January 29.

PSYCHOTHERAPEUTICAL PROBLEMS WITH UNIVERSITY STUDENTS

(Continued from page 144)

SUMMARY

The psychiatrist associated with the university student health center should not work as an individual but as the medical head of a psychiatric team of clinical psychologist, case worker and psychiatrist. The team's function should not only be diagnostic and therapeutic within the health center but should extend to constructive consultation to all campus groups dealing in student therapy. The team should have an intimate relationship with other health center physicians so that the latter can be helped in terms of dynamic diagnosis and psychotherapy. Psychotherapy by members of the team differs in many ways from psychotherapy off campus. Limitations of classes, examination schedules and ending of academic quarters should be taken into account in choice of cases and plan for treatment. Group psychotherapy with specially chosen patients has proved effective.

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American College Health Association News

The Executive Committee of the American College Health Association has approved three institutions for membership in the Association. We therefore extend a welcome to:

Barnard College, New York 27, New York, a privately endowed liberal arts college with an enrollment of 1,010 undergraduate women. Marjory Nelson, M.D., is the college physician and the official representative to the Association. In addition to Dr. Nelson, a part time psychiatrist, two full time nurses and one part time nurse complete the staff of the medical department.

Virginia State College, Petersburg, Virginia, with an enrollment of 645 men and 782 women, including both undergraduate and graduate students. The two full time physicians are C. H. Townes, M.D., director, and C. F. Mathews, M.D. Five full time nurses, with Mrs. H. Bernice Montague, R.N., as supervisor and the dietitian, Mrs. Gloria Moore, are on the health service staff.

West Virginia State College, Institute, West Virginia, with Charles Hawkins, Ph.D., as director of the department of health, physical education and safety. The enrollment of undergraduate students includes 525 men and 460 women. The staff consists of three part time physicians, four full time nurses, three part time nurses, two part time dentists, a part time dental hygienist, a sanitarian, a health educator, and a medical technician.

° ° °

The first official call has been issued to Ohio college and university health directors and their staffs to attend the 1952 meeting of the *Ohio College Health Association*. The meeting will be held May 9 and 10 at Wittenberg College, Springfield, Ohio.

Dr. J. Roger Marquart, College Physician at Wittenberg, is chairman of the committee on arrangements and program. Other members of the committee are Dr. George T. Blydenburgh of Ohio Wesleyan University, Dr. Karl Feistkorn of Ohio State University, and Rena E. Coppess, R.N. of Wittenberg College.

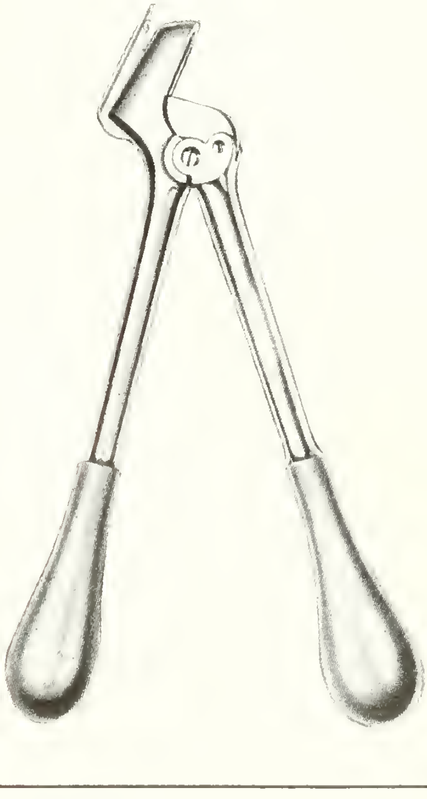
The theme of the meeting will be "Campus Administrative and Public Relationships." Representative students and deans of students will be invited to participate in the program.

SIMPLIFIED PERCUTANEOUS ANGIOGRAPHY

(Continued from page 141)

In the past year, there have been only three failures out of a total of eighty attempts by this method. The incidence of untoward reactions has been unusually low, possibly because of the small, spaced doses of 35 per cent diodrast.

Three unintended vertebral punctures have been accomplished with this needle by some of the less experienced angiographers. Their excellent demonstration of the vertebral-basilar system has prompted the author to attempt deliberate vertebral puncture with the special needle. Although candidates for that procedure have not been encountered recently, it is believed that transfixion or accidental withdrawal can be obviated in vertebral angiography just as has been proved in carotid angiography.



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*Editorial Comment: N. Y. State J. Med. :2770, 1949.

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Notices . . .

NORTH DAKOTA STATE MEDICAL ASSOCIATION

The North Dakota State Medical Association will hold its sixty-fifth annual meeting at Fargo, May 10 to 13, 1952. A full program of business and scientific sessions will be found in the next issue of THE JOURNAL-LANCET.

° ° °

AWARD FOR CEREBRAL PALSY

The Louis Lefkoe Memorial Foundation offers a prize of $500.00 for the most worthwhile original contribution to the medical knowledge of cerebral palsy. The paper is to be in the customary format for publication of medical literature. It may cover any aspect of the subject, such as pathogenesis, biochemical knowledge, pathology, diagnosis, treatment, etc. The paper is to be submitted on or before September 1, 1952 to the trustees of the Louis Lefkoe Foundation, 601 Medical Arts Building, Sixteenth and Walnut Streets, Philadelphia 2, Pennsylvania.

° ° °

UNIVERSITY OF MINNESOTA CONTINUATION COURSES

A course in *Surgery* will be held April 7 to 9, and will be concerned primarily, but not exclusively, with pediatric surgery. Guest speaker will be Dr. Robert Gross, Harvard Medical School and surgeon-in-chief of the Children's Hospital, Boston. The course will be under the direction of Dr. O. H. Wangensteen, head of the department of surgery.

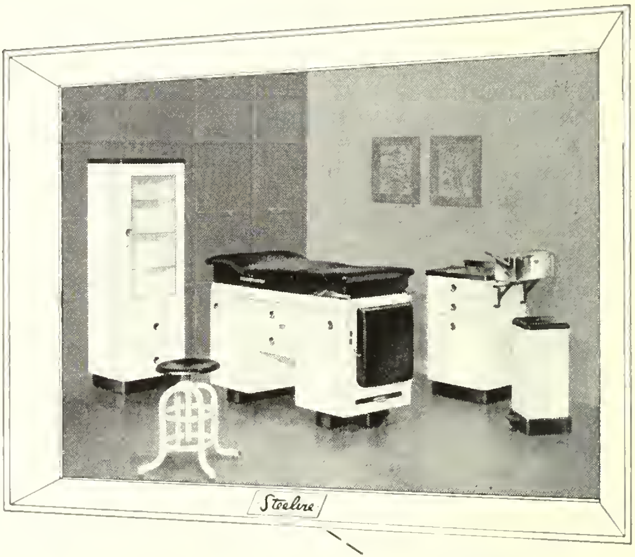
A course in *Proctology* will be held April 14 to 19. All aspects of anorectal disease will be covered, and two half days will be devoted to operative clinics. Visiting faculty member will be Dr. Garnet W. Ault, professor, department of proctology, Georgetown University.

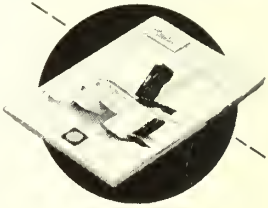
A course in *Obstetrics* for specialists will be held April 17 to 19. The visiting faculty member for the course will be Dr. S. M. R. Reynolds, physiologist, department of embryology, Carnegie Institution of Washington, Baltimore, Maryland. He will deliver the annual Duluth Clinic Lecture on the subject, "Newer Concepts of Fetal Circulation," on Friday, April 18.

A course in *Pediatrics* will be held on April 21 to 23. Emphasis will be placed on infectious diseases as they occur in pediatric practice. Dr. John M. Adams, professor, department of pediatrics, University of California, will be visiting faculty member for the course. Dr. Adams will also deliver the annual Clarence M. Jackson Lecture sponsored by the Phi Beta Pi medical fraternity on the subject "Respiratory Diseases—Changing Concepts."

A course in *Eye, Ear, Nose, and Throat* will be presented from May 12 to 14, 1952. One day will be devoted to the consideration of ocular problems, and the remainder of the time will be devoted to those ear, nose and throat conditions which are most frequently seen in general practice. Dr. Erling W. Hansen, clinical professor and director, division of ophthalmology, and Dr. George M. Tangen, clinical assistant professor, division of otolaryngology, will direct the course.

The eighth biennial continuation course in *Otolaryngology* will be held June 23 to 27, under the direction of Dr. Lawrence R. Boies and associates of the University of Minnesota medical school.





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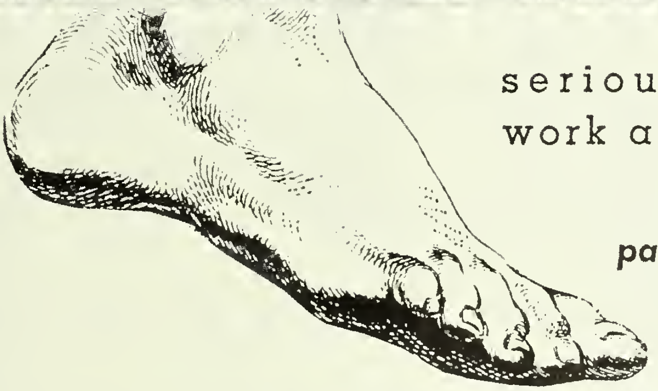

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INTERNATIONAL MEETINGS

Commonwealth and Empire Health and Tuberculosis Conference, Central Hall, London, England, July 8-13. Dr. J. H. Harley Williams, Tavistock House North, Tavistock Sq., London, W.C.1, England, Secretary General.

Congress of the International Diabetes Federation, Leyden, Netherlands, July 7-12. Dr. F. Gerritzen, 33, Prinsegracht, The Hague, Netherlands, Secretary.

European Congress of Cardiology, University of London, Bloomsbury, W.C.1, England, Sept. 10-12. Dr. K. Shirley Smith, 35 Wimpole St., London, W.1, England, Secretary.

European Society of Cardiovascular Surgery, Strasbourg, France, Oct. 3-4. Sir James Learmonth, Department of Surgery, University New Buildings, Edinburgh 8, Scotland.

Interamerican Cardiological Congress, Buenos Aires, Argentina, Aug. 31-Sept. 7. Dr. Blas Moia, Larrea 1132, Buenos Aires, Argentina, Secretary-General.

Inter-American Congress of Radiology, Mexico City, Mexico, Nov. 2-6. Dr. Guido Torres Martinez, Marsella No. 11, Mexico, D.F., Secretary-General.

International College of Surgeons, Madrid, Spain, May 20-24. Dr. Max Thorek, 850 West Irving Park Road, Chicago, Ill., U. S. A., Secretary-General.

International Congress of Comparative Pathology, Madrid, Spain, May 4-11. Prof. Carda-Aparici, Calle Fernando VI.8, Madrid, Spain, Secretary.

International Congress of Dermatology and Syphilology, London, England, July 21-26. Dr. Gordon B. Mitchell-Heggs, 5, Lisle St., London, W.C.2, England, General Secretary.

International Congress on Diabetes, Leyden, The Netherlands, July 7-12. Dr. F. Gerritzen, 33, Prinsegracht, The Hague, The Hague, Netherlands.

International Congress of Haematology, Mar del Plata, Argentina, Sept. 21-26. Dr. Carlos Reussi, Anchorena 1710, Buenos Aires, Argentina, Secretary.

International Congress of Internal Medicine, Friends House, London, N.W.1, Eng. Sept. 15-18. Sir Harold Boldero, 12 Pall Mall East, London, S.W.1, England, Secretary.

International Congress on Neuropathology, Rome, Italy, Sept. 8-13. Dr. Armando Ferraro, 722 W. 168th St., New York, N. Y., U. S. A., Secretary General.

International Congress of Oto-neuro-ophthalmology, Lisbon, Portugal, April 22-26. Prof. Diogo Fustado, Servico de Neurologia, Hospital dos Capuchos, Lisbon, Portugal, General Secretary.

International Congress of Physical Medicine, London, England, July 14-19. Dr. A. C. Boyle, 45, Lincoln's Inn Fields, London, W.C.2, England, Hon. Secretary.

International Union Against Tuberculosis, Rio de Janeiro, Brazil, Aug. 24-27. Prof. Etienne Bernard, 66 Blvd. St. Michel, Paris 6e, France, Secretary-General.

Neuroradiologic Symposium, Stockholm Sweden, Sept. 17-20. Docent Ake Lindbom, Symposium Neuroradiologicum, Serafimerlasarettet, Stockholm K., Sweden, Secretary.

Pan-American Congress of Gastroenterology, Mexico City, D. F., May 11-17. Dr. R. Flores-Lopez, Calle Dr. Balmis, No. 148, Mexico City, D. F., Secretary.

Pan-European Congress of Gastroenterology, Bologna, Florence and Rome, Italy, April 20-26. Prof. Guido Bassi, Policlinic of St. Orsola, Bologna, Italy, Secretary.

World Medical Association, Athens, Greece, Oct. 12-16. Dr. Louis H. Bauer, 2 East 103d St., New York 29, N. Y., Secretary-General.

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FOREWORD . . . .

The Journal-Lancet has again been able to bring together an admirable collection of papers for the annual tuberculosis issue.

It includes some general overall consideration of the tuberculosis problem as a whole, such as those by Dr. Robert J. Anderson, director of the Division of Chronic Disease and Tuberculosis of the Public Health Service of the Federal Security Agency and the report of the Committee on Tuberculosis of the American College Health Association.

Diagnosis and case finding are considered in the articles dealing with the tuberculin test as an evaluation procedure, and routine photoradiography in a general hospital.

The various aspects of modern treatment of tuberculosis are considered, including antimicrobial therapy, bronchoscopy, and thoracic surgery, as well as consideration of the emotional problem of tuberculosis by my ex-fellow Minnesotan, Harry A. Wilmer, of "Huber The Tuber" fame. Dr. Wilmer's unconventional pioneering research in the emotional problems of the tuberculous patient is receiving national attention and the National Tuberculosis Association has had the privilege this past year of making a small financial contribution to these interesting researches by Dr. Wilmer.

Again, I commend this issue to all who are interested in the control of tuberculosis, and congratulate The Journal-Lancet *on making these pertinent presentations available.*

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What's Past Is Prologue*

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As a few of you know, I am not only a native Minnesotan, but I also studied medicine here at the University. In a very real sense, attending the annual meeting of the Minnesota Public Health Association is a homecoming for me. And because the control and eventual eradication of tuberculosis is the goal of my work in the Public Health Service, this homecoming is surrounded with even more pleasure than might be prompted merely by local pride. For no state in the union has worked more vigorously than Minnesota to banish the shadow of tuberculosis from within its gates. From a mortality rate of approximately 110 per 100,000 population in 1918, you have achieved what Dr. J. Arthur Myers rightly calls "a phenomenal tumbling down" to the rate of 11.1 per 100,000 in 1950.

One of the most sensitive indicators of progress in tuberculosis control, it seems to me, is the rate of infant mortality. Since the disease is not inherited, and since an infant's possible contacts with persons with tuberculosis are sharply limited in number, an infant usually does not fall prey to tuberculosis unless we have allowed him to become exposed to disease in his immediate family. Back in 1916 the mortality among infants under one year from tuberculosis in Minnesota was 68 deaths—a rate of 140.4 per 100,000 population in the age group. Since then the rate has been reduced almost to the vanishing point. Last year, despite an increased population, only one infant died of tuberculosis in Minnesota.

Progress in controlling tuberculosis has been achieved here because you have been wise enough to adopt a coordinated, cooperative approach to the problem. State and county medical societies have given their understanding cooperation. State and local health departments have worked enthusiastically. The State Social Security Department has assumed responsibility for operating some of your hospitals. And clearing the way for community-wide efforts, has been this Association, with its enthusiastic program of health education throughout the community.

In the past, new developments in public health have often been foreshadowed by techniques perfected in the campaign against tuberculosis. The voluntary health agency, the public health nurse, the idea of public sanatorium care above the level of indigence—these are but a few of the contributions to general public health practice that have been made by tuberculosis workers. And this will also be the case, I hope, with this coordinated, cooperative approach that has worked so well here in Minnesota. I believe this common attack on the indivisible problems of public health and public welfare will prove to be strikingly successful if it is directed toward the chronic diseases.

The problems we encounter in the field of chronic disease are comparable in many respects to the problems met in controlling tuberculosis. Although communicability is not a common factor, of course, casefinding is essential to both. Like tuberculosis, several of the chronic diseases are of slow onset, and thus we face the problem of developing casefinding techniques for—let us say—diabetes or heart disease that will be the equivalent of the 70 mm. x-ray film in tuberculosis. We know less about the etiology of many of the chronic diseases than we know about tuberculosis, but it does seem plain that, as with tuberculosis, the secrets of the chronic diseases will eventually yield to clinical research and epidemiology. The chronic diseases also require long periods of treatment and convalescence and thus give rise to a series of social and economic problems that must be faced by the patient and the community. I think you will agree that the similarity between tuberculosis and the chronic diseases is a challenging one, and that the technique of what might be termed a total approach to tuberculosis that you have worked out so well might also be applicable to chronic diseases.

Because of the progress already made in Minnesota, because of the low mortality and morbidity rates, because of your relative adequacy of hospital beds—you tuberculosis control workers in Minnesota now have a rare opportunity. Minnesota, as you know, was the scene of Dr. Herman E. Hilleboe's notable follow-up study of patients discharged from tuberculosis sanatoria. For the first time, the mortality experience for a full decade in discharged tuberculosis patients was studied on a state-wide scale. The importance of such an investigation is especially great in a disease of slow evolution like tuberculosis. Excess mortality due to tuberculosis may occur in the population at any point in time throughout the span of life. It is therefore necessary to observe a large group of people for a long period of time before it is possible to establish the rates of mortality and morbidity prevailing in successive periods of the normal life-span. Although such studies are necessarily difficult to do, they have been done here in Minnesota.

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*A talk by Dr. Anderson at the annual meeting of the Minnesota Public Health Association, Minneapolis, October 23, 1951.

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The mortality of discharged patients from 1926 through 1935 was studied, but there has been no such follow-up study made since that time. I believe you will agree with me that carrying this research through the decade from 1936 to 1945 and then from 1946 through 1955 would certainly be tremendously valuable. The decade originally studied was a period when mass health education was still being developed, when bed rest was the usual treatment, and when there were not even enough beds. However, the years from 1936 through 1945 brought the introduction of collapse therapy, the beginnings of mass casefinding activity, and the development of primary surgical techniques such as the thoracoplasties and pulmonary resection. And since 1945, we have seen little or no waiting lists for admission in Minnesota, the development of even more advanced surgical techniques, and the introduction of chemotherapy.

What has been the combined effect of these methods of treatment on the mortality experience of discharged tuberculosis patients? To what extent has changing duration of treatment or residence in a sanatorium been a factor in later mortality? In the light of mortality experience, are we using our medical and social resources as efficiently as possible? Significant questions such as these will be answered by a well-designed follow-up study of patients discharged from tuberculosis sanatoria.

Home care for tuberculosis patients is another research problem that I should like to see studied carefully in Minnesota. By home care, I mean an organized plan for the provision of medical, nursing and social services in their own homes to patients who would otherwise be treated within the hospital. I am not referring to the outpatient and clinical services, which we have had for years in tuberculosis. I mean the concept of home care which has been developed in several areas in this country and rather extensively in England.

The hospital must have, or be able to employ, the extra medical, nursing and social staff required to provide these services in the home. Similarly, laboratory, x-ray and ambulance facilities of the hospital must be adequate to meet the increased demands. The hospital undertaking home care must be well-located in relation to a sufficient number of patients. The patient must be "ready" to go home. The diagnosis will have been established and his regimen worked out. He must want to go home — and not be fearful.

The homes in which the hospital proposes to give care must also satisfy a number of requirements. There must be enough room to afford the patient rest and the family protection. There must be some willing person available and capable of giving the home patient the care he needs. The family budget may have to be reinforced, and there should be assurance that the patient will be relieved of family responsibilities that interfere with his treatment. The family may need help in carrying the added responsibilities which care for the patient may entail.

As you can see, proper home care is not an easy matter to arrange, and certainly more experimentation with home care is needed before we will be in a position to evaluate its usefulness. There is no question but that there has not yet been sufficient trial of home care in tuberculosis, for example, to permit us to pass judgment on this new procedure. And this is another field in which Minnesota is in an unusually good position to make a valuable contribution.

To the best of my knowledge, home care plans for tuberculosis patients have never been conducted in a community where sanatorium beds were not at a premium. Indeed, in reviewing accounts of home care projects one frequently finds the statement that home care was undertaken precisely *because* of an acute shortage of beds. Under the circumstances, I think it is vital that we have the experience of a home care program in a community *without* a shortage of sanatorium beds. I believe you will agree that it is important for us to see the results of home care where medical decisions are made in the absence of any pressure due to a long list of patients awaiting admission to the hospital. Only in such a situation, can decisions to send a patient home or keep him in the hospital be made without even the possibility of an underlying bias. So it seems to me that Minnesota might well be the scene of an experiment in the home care of tuberculosis patients. Certainly in this state there is not the relentless pressure of patients awaiting admission that is seen in other places. Your decision to put a patient on home care could be in terms of your sound medical and social evaluation.

All of us are greatly interested in knowing what happens to certain other statistical measures when mortality is quite low. *Everybody's Health* reports that Minnesota had 331 deaths from tuberculosis in 1950. But who were these people and why did they succumb to tuberculosis? I would say that with this figure we know the new dimensions of the control problem, but not necessarily its configuration. More facts are needed to reduce mortality even further. Therefore, the morbidity records should be analyzed to determine who is getting tuberculosis. To what extent are racial, economic or occupational factors playing a part? What is the ratio of urban cases to rural cases? The population to be studied is comparatively small in Minnesota, which makes the research more feasible. More important, however, is the possibility that such morbidity research may reveal that the composition of the tuberculous population in a time and place of low mortality differs significantly from the composition of the tuberculous population in a time and place of higher mortality.

Then there is the problem of the person with positive sputum who is not hospitalized. In some places and in some cases, a shortage of beds is, in part, the reason. But this cannot be advanced as a factor in Minnesota. Indeed it might explain why the number of such cases is only about two-thirds the number found in other areas. It cannot be denied that knowledge of patients with positive sputum outside hospitals indicates good casefinding combined with thorough search for tubercle bacilli. But it must be admitted that such cases require not only very close medical supervision but something even further. What are the individual economic, social or emotional forces at work which prevent these patients from accepting treatment? We will never eradicate tuberculosis until these questions are answered.

We recognize that, despite our best efforts, there are persons who will not willingly go into a hospital and accept the isolation so necessary to protect the community. Because of these persons, I see no other way of protecting the public health except by the power of compulsory hospitalization. To make your new Commitment Act effective, facilities must be provided so that sanatoria can adequately house and care for such patients with a minimum of disruption to hospital routine. But after all, our responsibility is to get at this hard core of the control problem and really dig out the reasons for the resistance of some persons to accepting treatment. Commitment is a device of last resort—it is no solution.

Another problem is one of early casefinding. For the country as a whole, in 1950 more than 25 per cent of the tuberculosis deaths were first reported by death certificates. In Minnesota during the past ten years, approximately 17 per cent of the tuberculosis deaths were first reported by death certificates. Thus Minnesota has a decidedly above-average performance in this respect, especially when we consider that in a number of states more than 40 per cent of the tuberculosis deaths were never reported as living cases. But when we look into this problem a little more closely, we find that, for the most part, it is still unsolved—even here.

It is surprising that, of the 425 tuberculosis deaths in Minneapolis, for example, during the period 1946-1948, only 207—or less than half—were known to the health department one year or more before death. After all, tuberculosis is usually of long duration. So we see that even though Minneapolis was successful in having most of its tuberculosis deaths reported as cases prior to death, less than half of these cases were known to the health department for one year or longer.

These figures suggest two thoughts to me. First, of course, is the necessity for intensifying efforts to find the living cases as early as possible. My second thought concerns research. Why and how do these people slip through our casefinding fingers? When and where could they have been detected? I should like to see a study made of tuberculosis deaths not previously reported, or not reported early. A state like Minnesota or a city like Minneapolis, where the number of such cases is relatively small in any one year, would be a good place for this much-needed study, it seems to me.

One important fact we will discover by an investigation of deaths not previously reported is the number of such deaths among transients or recent arrivals. Naturally, the casefinding apparatus of Minnesota cannot be held at fault if the person with tuberculosis recently came from out of the state. I know that you have been faced with the problem of tuberculosis among Mexican workers, new immigrants and foreign students. It is gratifying to know that you are hospitalizing persons with open tuberculosis regardless of how recently they moved to Minnesota. This is not the situation in all of the states, unfortunately. Most states offer no care whatsoever to a tuberculosis patient unless he has lived within their borders for a sufficient number of years to attain legal residence. A few states give temporary or emergency care or else hospitalize infectious patients, as you do here. Only ten states and three territories have more generous admission requirements.

Although the stumbling-block of residence requirements has been partially overcome for the purposes of tuberculosis control here in Minnesota, it remains a major problem in most other states. Their success in solving this problem will affect your own control program, of course. Because of this, and because your state legislature has just created a Commission to Study Tuberculosis, I should like to discuss the general question of residence requirements.

To begin with, we are a nation of travelers and sojourners. In recent years, according to the Bureau of the Census, more than three per cent of our adult population moved across state lines. During the same period, just less than three per cent moved from one county to another within the same state. In the age group from 18 to 34, the percentages in both of these categories are considerably higher. Next, I believe it important to distinguish between ordinary travelers and transient workers, particularly migrant agricultural workers. I think it also important to distinguish between people who have residence in a state other than the one in which they are living and people who have no residence anywhere. Then there are people who are residents of their state but not of the county in which they live. These distinctions may seem fine ones or even absurd ones to draw, but if you examine the crazy-quilt of state and county legislation defining eligibility in terms of residence and ability to pay, you will see that my categories are *not* so far-fetched.

The freedom to move across state boundaries may contribute somewhat to a local problem of tuberculosis control, but especially in times like these, we must encourage and safeguard the mobility of our people. Obviously only a very small fraction, generally speaking, of the millions of people who change their residence will have tuberculosis, although there may exist certain special local situations, as with the migrant workers and recent immigrants here in Minnesota. On the other hand, there is no evidence to prove that people move from one state to another solely to qualify for aid. Nevertheless, these patch-work residence requirements cause great hardship to many individual patients as well as hinder the whole fight against tuberculosis.

The organized campaign to eradicate tuberculosis started about half a century ago, and in all that time only a few of the states and territories have eliminated the residence requirement barrier to control of the disease. How long will we have to wait for the others to catch up? I do know that Michigan has been caring for tuberculosis patients regardless of how long they have resided in the state. They have even been treating a number of aliens who found themselves with tuberculosis in Michigan. I understand that there has been no great rush of people from elsewhere to take advantage of this Michigan procedure, and that relaxing admission requirements in this way has not hampered their control program.

Can we envision some joint action which will alleviate the hardship of the sick man who is not a resident, diminish the danger of infection to the community, and make it possible for the state both to take care of the patient and protect its citizens? Until we eliminate residence requirements, would some federal program enable states to close this dangerous gap in their tuberculosis control programs? Perhaps a payment to hospitals based on the number of patient/days of treatment would be an acceptable answer to this problem, until residence requirements are eliminated. In any event, the obstacles that prevent us from caring for these unfortunate people must be dealt with, if we are to complete our task of eradicating tuberculosis.

When one attempts to cope with immediate problems like the means test and residence, it is only too obvious that certainly we physicians alone cannot solve them. Not even all the voluntary and professional public health workers can remove some of the obstacles to *total* eradication. We can find the cases, we can provide the beds, we can more and more frequently arrest the disease. But the responsibility for complete eradication rests with the entire community. Every institution and every member of society must help us restore to health and usefulness the victims of the disease.

Antimicrobial Treatment of Pulmonary Tuberculosis*

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REMARKABLE progress has been realized during the past decade with the advent of antibiotic and chemotherapeutic agents which can modify the clinical course of pulmonary and extrapulmonary tuberculosis. An excellent review of the use of dyes, guaiacol, creosote and its derivatives, chaulmoogrates and moorhantes, and the heavy metals including arsenic, copper, mercury and gold salts was recorded by H. Gideon Wells in 1932.[1]

The advent of the sulfones revived considerable enthusiasm on the basis of *in vitro* and *in vivo* studies.[2] However, these agents possessed a relatively high degree of toxicity and failed to alter the course of human clinical tuberculosis. In many respects investigation of the sulfones in 1940 may be regarded as a prologue to the modern era of chemotherapy. Shatz, Bugie and Waksman[3] in 1944 reported a new antibiotic derived from *Actinomyces griseus* which possessed striking *in vitro* effects against *Mycrobacterium tuberculosis.* Feldman and Hinshaw[4] in the same year recorded that streptomycin was capable of altering the course of experimental tuberculosis in guinea pigs to an extent never realized with any other agent. Other drugs followed. Lehmann[5] in Sweden working on the basis of Bernheim's investigation[6] demonstrated that para-aminosalicylic acid (PAS) possessed definite and significant tuberculostatic action. Behnisch, Metzsik, Schmidt in collaboration with Domagk[7] developed amithiozone (Conteben, TB-1) which has received extensive clinical trial in Europe but has been met with less enthusiasm in this country. Antibiotics such as viomycin and Terramycin are currently under investigation, while others such as Neomycin,[8] which possessed many admirable and encouraging properties, may never pass the threshold of limited clinical investigation because of the toxicity associated with systemic administration.

ANTITUBERCULOUS AGENTS

The ideal chemotherapeutic agent for tuberculosis should possess maximum therapeutic effectiveness, minimal toxicity, and should be of such nature that organisms would not readily develop resistance to it. Since single agents do not fulfill all of these criteria, Demerick[9] postulated that combined therapy might be the most effective means of preventing the origin of resistant strains of bacteria. Data summarized in Tables I and II represent clinical investigational experience employing single agents and combinations of drugs. These studies previously reported from Fitzsimons Army Hospital[10,11,14] were made on patients with bacteriologically proved pulmonary tuberculosis greater than minimal in extent. Duration of antimicrobial therapy on all regimens was 120 days and the evaluations were based on uniform criteria. The following discussion of antituberculous agents is based on these experiences.

Streptomycin. Though superseded by the development of other antimicrobial agents effective in tuberculosis, streptomycin and dihydrostreptomycin remained the most single effective drug agents currently available for clinical use. The early anticipation that dihydrostreptomycin would possess less neuro-toxicity relative to the eighth cranial nerve has not been borne out by clinical experience.[12] Neither form of streptomycin possesses therapeutic advantage over the other; strains of tubercle bacilli resistant to one form are invariably resistant to the other to an identical degree. A single advantage of having two forms of streptomycin available occasionally presents itself when a patient will manifest allergic phenomena, such as skin rash, to one form but not the other.

When streptomycin is administered in dosage of one or two grams *daily* for 120 days, 70 to 80 per cent of the patients manifested improvement in symptomatology as measured by decrease in cough, quantity of sputum and a weight gain of five or more pounds; a similar percentage

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TABLE I

COMPARATIVE EVALUATION OF ANTITUBERCULOUS AGENTS

230 Patients with Pulmonary Tuberculosis Treated 120 Days

Fitzsimons Army Hospital 1947-1951

		X-ray Improvement			Bacteriologic Response	
Regimen	Number of Patients	All Degrees	Moderate or Marked	Toxicity	Negative	Resistant*
		Per cent	Per cent	Per cent	Per cent	Per cent
SM 1.0 or 2.0 gm. QD*	66	74	22	58	21	76
SM 1.0 or 2.0 gm. Q3D**	97	71	28	5	37	33
PAS 12 gm QD	25	76	8	5	28	33
Amithiozone 200 mg QD	42	31	4	78	19	15

*Per cent calculated on basis of number of positive patients on completion of therapy. Resistance to SM, PAS, or amithiozone defined as growth on tube containing 10 mcg of drug per milliliter equal to growth on control tube.

*QD = daily. **Q3D = every three days.

showed a definite to striking degree of improvement as evaluated by chest roentgenograms. However, these excellent and encouraging findings were offset by two factors which placed a very real limitation on the usefulness of this regimen of therapy: (1) Approximately one-half of the patients manifested varying degrees (usually slight) of eighth cranial nerve damage. (2) Seventy to 80 per cent of the patients positive on completion of therapy yielded organisms which were resistant to streptomycin. Development of resistance to streptomycin imposes a significant limitation on the usefulness of this drug agent.

However, when streptomycin is administered in dosage of one or two grams every third day for 120 days, the incidence of toxicity becomes virtually nil (5 per cent) and the incidence of resistance is decreased by half (33 per cent). The therapeutic effect following four months of *intermittent* streptomycin therapy is preserved to essentially the same degree as that attained with daily administration of streptomycin. Sputum conversion (National Tuberculosis Association Standards) and cavity closure on both daily streptomycin and intermittent streptomycin occurs in a minority of the patients treated. Other limitations of short courses of drug therapy are apparent when it is realized that clinical, x-ray or bacteriological relapse is common and may occur in one-fourth of the patients treated when drug therapy is discontinued. It is, therefore, important to follow up drug therapy with further bed rest and medical collapse or surgical forms of therapy when indicated.

Para-aminosalicylic acid (PAS). Pas is usually administered orally and the average adult will tolerate 12 grams daily in three to four divided doses. Varying degrees of gastrointestinal irritation, such as anorexia, nausea, vomiting, and diarrhea may occur in a small percentage of the patients. However, PAS is virtually free from other forms of toxicity and may be successfully administered intravenously or subcutaneously with excellent plasma and spinal fluid levels. PAS is acetylated in the liver and excreted by the kidneys; the acetylated form of PAS possesses only a slight degree of tuberculostatic activity. The administration of a benzoic acid derivative, "Benemid",[13] is capable of enhancing PAS plasma levels, but to date clinical evidence is incomplete as to whether or not "Benemid" may play a role as an adjunct to PAS therapy.

Approximately two-thirds of the patients treated with PAS manifested varying degrees of clinical and roentgenographic improvement, but PAS did not compare favorably with streptomycin, in that most of these cases showed only slight improvement (one-third to one-half of the cases who received streptomycin manifested either moderate or marked improvement). Cavity closure and conversion of sputum occurred in a minority of patients receiving PAS singly. Resistance is also a problem encountered with the administration of PAS, and it is noted that 30 per cent of the patients with positive sputa on completion of therapy were resistant to 10 mcg./ml. of PAS. It is significant to note, however, that the majority of patients resistant to PAS spontaneously reverted to sensitive within a period of six month after therapy was discontinued. It was distinctly unusual for organisms which had become resistant following four months of continuous or intermittent streptomycin therapy to revert spontaneously to sensitive after therapy was discontinued.

Amithiozone. Amithiozone is less effective therapeutically than either PAS or streptomy-

TABLE II

COMPARATIVE EVALUATION OF COMBINED DRUG REGIMENS IN PULMONARY TUBERCULOSIS

217 Patients Treated 120 Days

Fitzsimons Army Hospital 1948-1951

Regimen	Number of Patients	X-ray Improvement All Degrees	X-ray Improvement Moderate or Marked	Toxicity	Bacteriologic Response Negative	Bacteriologic Response Resistant*
		Per cent	Per cent	Per cent	Per cent	Per cent
SM 2.0 g Q3D and PAS 12 g QD	95	80	48	13	67	SM 0, PAS 0
SM 2.0 g Q3D and PAS 12 g Q3D	103	96			49	SM 30 PAS 0
SM 2.0 g Q3D and TB-1 100 mg QD	19	89	47	10	47	SM 33 TB-1 0

*Per cent calculated on basis of number of positive patients on completion of therapy. Resistance to SM, PAS, and amithiozone defined as growth on the tube containing 10 mcg of drug per milliliter equal to growth on control tube.

cin.[14] The inherent toxicity of this drug is far reaching and manifests a predilection for the hepatic and hemapoietic systems. When administered in dosage of 200 mg. per day over a period of 120 days, gastrointestinal irritation (anorexia, nausea and vomiting) occurred in approximately one-half of the patients. Preexisting hepatic or bone marrow disease represents a contraindication to amithiozone. Rational for this is substantiated when it is noted that amithiozone commonly produces anemia (26 per cent of the patients were noted to have a decrease of two or more grams in hemoglobin) when administered in dosage of 200 milligrams per day. Fourteen per cent of a series of 42 patients experienced bromsulfalein retention varying from 10 to 25 per cent during the course of therapy. Aside from simple depression of the bone marrow, one must constantly be aware of the possibility of acute hemolytic anemia, leukopenia, or agranulocytosis. Thirty-five to 50 per cent of patients receiving amithiozone show varying degrees of improvement from a clinical and roentgenographic viewpoint after completion of 120 days of therapy. However, in most instances the degree of improvement is only slight. The reduction of dosage of amithiozone to 100 milligrams per day greatly alleviates clinical and laboratory toxicity encountered. However, amithiozone is less effective in this dosage, and when combined with streptomycin is not capable of modifying development of resistance to the latter drug.

Other drugs: Limited studies to date on both viomycin[15] and Terramycin[16] disclose that these drugs possess definite therapeutic merit and further clinical trial appears warranted. Either of these drugs administered singly is capable of favorably modifying pulmonary tuberculosis and when combined with streptomycin they are capable of delaying the emergence of resistance to the latter drug. Viomycin toxicity occurs frequently and is potentially serious in scope and magnitude. Recent studies disclosed that when viomycin is administered intermittently in dosage of two grams every third day, toxicity is relatively minor and transient in nature with reference to the kidneys, blood electrolyte pattern, and eighth cranial nerve.[17] No significant toxicity has been observed when Terramycin is administered in dosage of five grams daily over a period of 120 days, although transient anorexia, nausea, vomiting and diarrhea is present in approximately 70 per cent of the patients treated.

Aldinamide, a chemical analogue of nicotinic acid is currently undergoing clinical investigation but its use may be limited by the rapid development of resistance of tubercle bacilli to this drug.[18]

THE CHEMOTHERAPEUTIC REGIMEN OF CHOICE

The chemotherapeutic regimen of choice is the combination of streptomycin and PAS. There is sufficient evidence to state dogmatically that combined drug therapy is always superior to drug agents used singly. When the patient is severely ill and toxic (in miliary and meningeal forms of tuberculosis) streptomycin should be administered daily. For adults, one to two grams of streptomycin has proved satisfactory, with the larger doses for patients weighing over 120 pounds. Impaired renal function is also an indication to employ smaller quantities of drug agents in general. PAS is administered concomitantly, usually in dosage of 12 grams daily in three to four divided doses. Gastrointestinal irritability is minimized if PAS is given during or following a meal. Nonmiliary pulmonary tuberculosis is best treated with intermittent streptomycin and daily PAS therapy for a period varying from four to eight or more months. Recent evidence shows that it is preferable to administer chemotherapy continuously rather than in short repeated interrupted courses.[19]

Combined intermittent streptomycin and daily PAS therapy administered for a period of 120 days resulted in 80 to 90 per cent of the patients showing clinical and roentgenographic improvement. Approximately one-half of these patients showed moderate to marked improvement by x-ray films. Approximately one-half were sputum negative on completion of four months' therapy. Excluding the occasional patient who manifests allergy to one or both drugs, toxicity sufficiently severe to discontinue the use of chemotherapy in this regimen is usually nil.

Furthermore, the incidence of resistance to streptomycin or PAS falls to zero* The intermittent administration of PAS every third day failed to modify the emergence of resistant organisms to streptomycin.

APPLICATION OF CHEMOTHERAPY IN THE TREATMENT OF PULMONARY TUBERCULOSIS

Planning and integrating chemotherapy in the treatment of pulmonary tuberculosis is of utmost importance and is governed largely by the type of lesions which predominate. As a general rule, drug therapy serves its best purpose in recent exudative and reversible types of disease. A workable program coordinating the use of chemotherapy with other types of therapy is mandatory. Therapy in all the categories given for active pulmonary tuberculosis includes strict bed rest.

1. *Unclassified lesions.* The new patient usually falls into this group unless classified by previous clinical studies, serial chest roentgenograms, or strong clinical evidence. As the clinical picture clarifies one of the classifications below may serve as a rational plan of definitive therapy. The use of tuberculostatic agents for the diagnosis or "therapeutic test" is rarely justified since streptomycin is also effective against many gram positive and gram negative bacteria. Premature or routine employment of chemotherapy in the absence of medical emergency may needlessly deny the clinician the opportunity of establishing unequivocally the diagnosis of tuberculosis since drug therapy frequently increases the difficulty of obtaining cultures of *Mycobacterium tuberculosis.*

2. *New, reversible lesions.* Whereas bed rest alone is often adequate in patients with new, diffuse, or nodular disease, chemotherapy frequently enhances both rapidity and completeness with which the disease subsides. Drug therapy over a period of four months is usually adequate when combined with strict bed rest. The presence of clearing is often dramatic in this type of disease, but the clinician must realize that chemotherapy is neither a substitute for bed rest during the active stage of the disease, nor does it reduce the need for the usual graduated ambulation and rehabilitation.

3. *New, poorly reversible lesions.* Extensive caseous pneumonic disease usually requires prolonged, combined intermittent drug therapy for six to eight months or longer. Temporary collapse measures (pneumoperitoneum, or pneumothorax) may serve as valuable adjuncts after the acute phase of the disease begins to subside, but residual localized necrotic and cavitary lesions are frequently surgical problems. Advances in thoracic surgery and chemotherapy have increased the indication for resectional surgery and thoracoplasty is no longer ideally restricted to the "good chronic" whose disease is several years old.

4. *New, resolving and poorly resolving disease.* The principles of therapy in this group are embodied in the above discussion.

5. *Old, irreversible lesions.* Localized fibrocaseous disease as illustrated by the "tuberculoma" or nonlocalized, disseminated, caseous nodose and necrotic lesions respond poorly, if at all, to chemotherapy. Although isolated instances of chronic disseminated nodular tuberculosis may prove to be an exception to this generalization, chemotherapy should be considered as an adjunct to chest surgery in old irreversible lesions.

6. *Mixed new and old lesions.* Drug therapy may be useful in the treatment of the recent component of the lesions and as an adjunct to operative procedures for the caseous necrotic residuals.

7. *Miliary tuberculosis.* A prolonged course of daily streptomycin and PAS is indicated and is usually administered continuously for six months following remission as determined by symptomatology, chest films, and bacteriology. Continuous prolonged combined chemotherapy is to be stressed.[20] If the patient does not tolerate oral PAS, parenteral PAS may be adminis-

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*The incidence of resistance to streptomycin varies with the level of arbitrary definition of "sensitive" and "resistant." In this paper organisms are termed resistant if the growth on the tube of Herrold's egg yolk media containing 10 mcg. of streptomycin per milliliter equals the growth on control tube.

tered either intravenously or subcutaneously. Preparations of sodium PAS are available which are non-irritating to the subcutaneous tissues and are absorbed rapidly by the addition of small quantities of hyaluronidase.[21] Procaine antagonizes the action of PAS and its use is contraindicated when PAS is administered by clysis.[22]

CONCLUSIONS

Although the results of antimicrobial treatment are often dramatic, it is quite apparent that drug therapy alone is neither definitive in a curative sense nor does it supplant time honored principles of therapy. The rational to support this dictum lies in part in the pathogenesis of tuberculosis *per se* as well as the fact that all agents or combinations of agents available to date exert predominantly a bacteriostatic rather than a bacteriocidal effect. The following principles of chemotherapy, showing that there is no shortcut in the treatment of tuberculosis, have been enumerated by the clinical Subcommittee of the Committee of Clinical Research and Therapy of the American Trudeau Society:

1. Drug therapy alone is not adequate treatment for tuberculosis.

2. The administration of antimicrobial agents should be carefully correlated with an overall program of medical and surgical treatment.

3. This should usually be done at a tuberculosis hospital or a tuberculosis division of a general hospital.

4. The emergence of drug resistant strains of tubercle bacilli may be delayed by the simultaneous administration of combined antimicrobials.

5. The best combination available today is one of the streptomycin drugs combined with para-aminosalicylic acid.[23]

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(Continued on page 225)

Bronchography in Chronic Disease of the Lung*

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BRONCHOGRAPHY, because of its very nature, has been the stepchild of many different specialties. The endoscopist, who in most localities is the otolaryngologist, the roentgenologist and the thoracic surgeon all share with the internist in varying degree the responsibility for the procedure of bronchography.

Jackson,[1] in 1905 by insufflation of bismuth oxide, was the first to successfully outline the tracheobronchial tree. In 1922 Sicard and Forestier[2] used Lipiodol as a contrast medium in the lungs for the first time, thus establishing bronchography as a useful diagnostic adjunct in the study of chronic disease of the lungs.

INDICATIONS FOR BRONCHOGRAPHY

The principal function of bronchography is in the diagnosis of bronchiectasis and determination of extent of involvement. The importance of early diagnosis of bronchiectasis either alone or in conjunction with other chronic disease of the lungs has been accentuated by the development of nebulization therapy and, in certain selected cases, pulmonary resection. The most frequent indication for bronchography is the presence of a chronic cough, productive, often in copious quantities, of green or yellow sputum, as distinguished from the mucoid sputum of asthmatic bronchitis, and the noisy but unproductive habit cough.

In socalled unresolved pneumonia, with x-ray changes persisting after six weeks, in clinically healed tuberculosis with negative sputum but persistent cough and in the late latent phase of chronic lung abscess bronchography may, at times, be of great value in detecting complicating bronchiectasis. It may also be of real diagnostic value in (1) cases in which pus is observed in a branch bronchus at time of bronchoscopy, (2) certain cases of hemoptysis, if still unexplained after physical examination, routine chest film, sputum studies and bronchoscopy, and (3) bronchopleural fistula.

Although some workers have found bronchography helpful in detecting bronchogenic tumors, particularly those in upper lobe bronchi and the smaller bronchioles, its field of usefulness is limited and interpretation of findings may be most inaccurate in view of incomplete filling of certain branch bronchi.[3,4]

REACTIONS AND CONTRAINDICATIONS

Although reactions do occur in iodized oil bronchography they are infrequent and relatively mild. The literature[3,5] contains isolated reports of transient coryza, lacrimation and an iodide type of skin eruption, principally in those patients who have swallowed a considerable quantity of the oil. An occasional patient with an allergic background will have transient urticaria or asthma. Mahon[5] has reported a fatal asthma-like reaction, presumably on the basis of allergy to iodine, in one individual. Swelling of the parotid and submaxillary glands appearing shortly after the instillation of oil and persisting for 24 to 48 hours is seen occasionally.

While the risk of bronchography is small, it can be materially increased by injudicious selection of cases. In the presence of severe myocardial damage or extensive pulmonary fibrosis and emphysema alarming dyspnea may be induced by sudden filling of the tracheobronchial tree with dye. Although asthma is not a contraindication to the procedure one should proceed with more caution and in some instances do only one side at a time. Dissemination of an acute lung abscess, active tuberculosis and other acute inflammatory disease of the lung by bronchography has been reported[3] and it has no place in the diagnostic study of these conditions.

WATER SOLUBLE MEDIA

Iodized oil, principally Lipiodol and Iodochloral, has been used up to the present time as the contrast medium in bronchography. Recently there have been reports of water soluble contrast media. One of them, produced by the Cilag Company in Switzerland, is called Ioduron B and another, Umbradill Viscous B, has received

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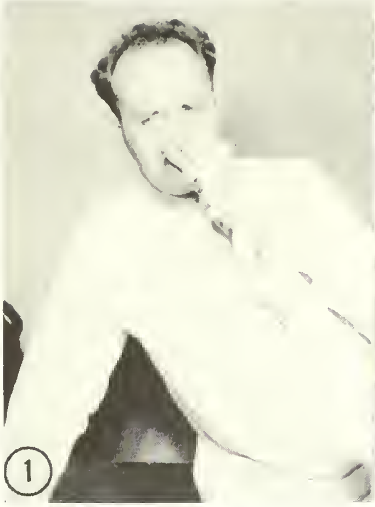

Figs. 1, 2, 3 and 4. See text.

extensive clinical trial in Sweden.[6,7]. The latter will in all probability be marketed in this country within the next year as Xumbradill.

Several studies are going on in this country on these newer water soluble agents and several preliminary reports have appeared in the literature.[8,9] The advantages of water soluble media (which are a combination of a Diodrast-like iodine compound and carboxy-methyl cellulose) over iodized oil are said to be: (1) The ability to change the viscosity of the water soluble media, by altering the concentration of carboxy-methyl cellulose. In this way it is possible to visualize the lesions of smaller branch bronchi beyond the reach of the bronchoscope. (2) The media adheres to the bronchial mucosa, rather than completely filling the lumen and, in this way, serves to outline small defects in the bronchial wall. (3) The media, being water soluble, mixes more completely with the bronchial secretions and thereby permits better filling and visualization of bronchiectatic cavities. (4) Rapid disappearance of the media from the lung fields. A film taken from three to 24 hours after bronchography will show no trace of residual media.

This rapid clearing of the lung field would seem to be the principal advantage of the water soluble media; it may prove of particular value when bronchography is indicated in patients with tuberculosis. In some instances iodized oil remains for many months and produces confusing shadows in the interpretation of subsequent films of the chest.[3] It is too early to know to what extent water soluble agents will replace iodized oil. They do deserve extensive trial in view of the enthusiastic reports from abroad.

SIMPLIFIED METHOD OF OBTAINING BILATERAL BRONCHOGRAMS

There are several methods of obtaining bronchograms. Introduction of the media by needle through the cricothyroid membrane in the throat has been largely abandoned because of local complications. The great disadvantage of the supra glottic method is that much of the oil may be swallowed and inadequate visualization of the tracheobronchial tree obtained. By the more dependable transglottic route the oil can be introduced by cannula, bronchoscope or rubber catheter. The latter is the method of choice in the majority of cases. Schmidt[10] has described a technique for transglottic catheter bronchography, which will be reviewed briefly:

(1) Postural drainage is carried out initially to remove retained secretions from bronchiectatic cavities. (2) Atropine, 1/150 grain, is given to reduce secretions. (3) Crystalline cocaine, freshly mixed in aqueous solution, is used for local anesthesia of the pharynx and larynx and a small amount instilled between the vocal cords by curved laryngeal cannula in order to anesthetize the traceha and carina. It is thought that the much feared cocaine reactions are largely avoided by using crystalline cocaine which is added to the solution immediately prior to use.

(4) A 16 F. rubber urethral catheter is introduced through the nose and usually passes without difficulty through the anesthetized larynx and into the trachea.

(5) The patient is placed on the x-ray table and instructed to lean to the right to a 50 degree angle with the table (figure 1). The operator withdraws the catheter an approximate hands breadth to make certain the tip of the catheter is above the carina of the trachea and instills 20 cc. of iodized oil. This position fills the right lower and middle lobe bronchi adequately.

(6) The catheter is taped to the cheek, the patient instructed to lie on his right side and the table tilted with the head down to a 45 degree angle (figure 2); this position is maintained for one minute.

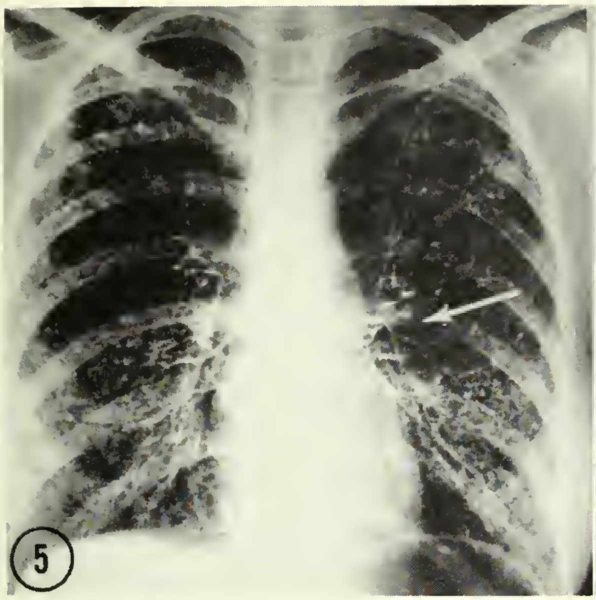

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Fig. 5. Arrow indicates lingular division.

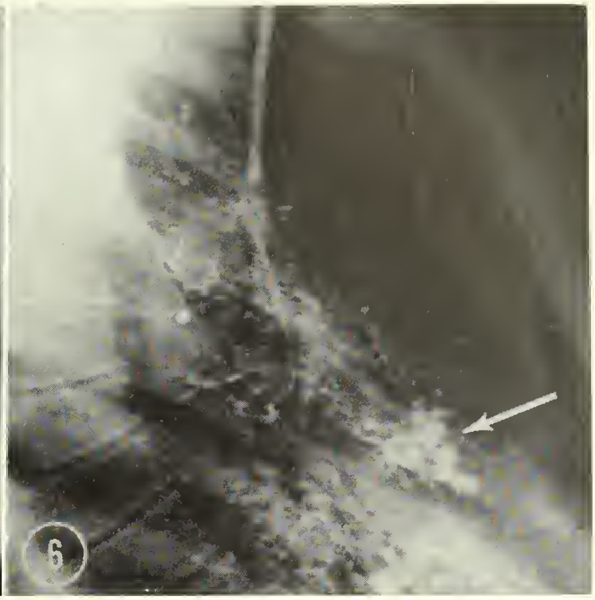

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Fig. 6. Arrow indicates middle lobe involvement.

(7) The table is returned to the horizontal, the patient rolled forward to lie on his right anterior thorax and the table is again tilted, head down, at a 45 degree angle for another minute (figure 3). This positioning fills all three branches of the right upper lobe. The table is returned to the horizontal and bronchograms of the right lung are taken in three positions: postero-anterior, right oblique and lateral.

(8) The patient is placed in a sitting position leaning to the left (figure 4) and with the catheter withdrawn sufficiently to clear the carina, another 20 cc. of iodized oil is instilled into the left bronchial tree. The catheter is removed and the patient instructed to lie on his left side, first in the left lateral and then left antero-lateral positions, head down, exactly as he did on the right. In this way all of the divisions of the left upper lobe are filled with contrast media. Two bronchograms are obtained of the left lung in the postero-anterior and the left oblique positions.

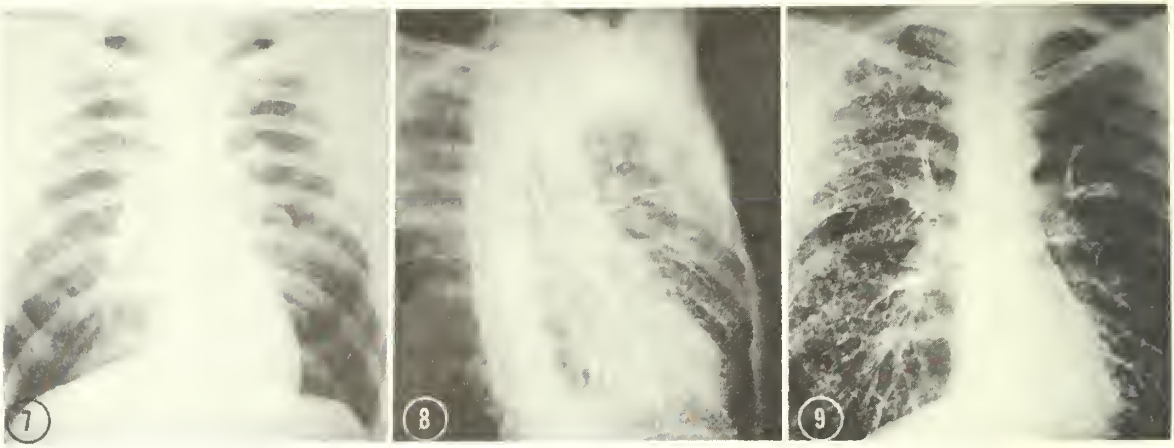
(9) The patient is placed in the head-down position and instructed in raising the iodized oil by postural drainage. This is best accomplished without hard coughing, for the latter is thought to blast more of the oil into the alveoli thus adding to the amount of oil retained in the lungs.

This technique has the following advantages: (1) It is simple to perform and does not require the services of a trained endoscopist. (2) Satisfactory visualization of both upper lobes can be obtained by positioning of the patient with catheter in place. (3) Bilateral bronchograms are obtained at one sitting. (4) There is a minimum of discomfort to the patient. It is tolerated well not only by adults but by older children. In very young children it is at times impossible to obtain satisfactory bronchograms without anesthesia. In such instances bronchograms are best made in conjunction with bronchoscopy with the child under ether anesthesia.

Figure 5 demonstrates the adequate filling of the upper lobes. The lingula can be seen arising from the left upper lobe bronchus, its usual but not constant site of origin. Proper identification of branch bronchi is of the greatest importance since the advent of pulmonary resection in bronchiectasis. An accurate bronchographic map of both lung fields is essential in determining whether a given patient with bronchiectasis is to be treated medically or surgically. To accomplish this, lateral and oblique views are as important as the postero-anterior bronchogram. For the sake of uniformity in identification of branch bronchi most workers have accepted the classification of Jackson and Huber.[11] Perhaps the most frequent error has been in doing left lower lobectomy for bronchiectasis and missing involvement of the lingular division of the left upper lobe. The right lateral view (figure 6) permits accurate identification of involvement of the right middle lobe distinguishing it from the involvement of the right lower lobe.

The following case report demonstrates one of the indications for, as well as the limitations of, bronchography in evaluating a given patient with chronic disease of the lung.

H. A., a man of 45 years, was seen first in 1949 with a two month history of wheezing, exertional dyspnea and a hard cough, occasionally productive of a small amount of green-yellow sputum. There had been one occasion with blood streaking of sputum and there had been a 12 pound weight loss. Past history was negative. The physical examination showed both lung fields



Figs. 7, 8 and 9. See text.

full of typical asthmatic wheezes and marked reduction of breath sounds in the left base. Tuberculin reaction and postural drainage test were negative. The routine chest x-ray film was negative except for bilateral basal emphysema (figure 7).

Bronchoscopy was advised and revealed neither a bronchogenic neoplasm nor an inflammatory bronchostenosis, but did demonstrate pus coming from the stem bronchus of the left lower lobe. Bronchograms were made, the left side first as the site of known involvement, for it was uncertain how well the patient would tolerate bronchography in the presence of severe asthma.

The oblique bronchogram of the left lung (figure 8) demonstrates bronchiectasis involving the three basal divisions of the left lower lobe. The lingula is seen to arise in the usual position from the left upper lobe bronchus, immediately beyond the bifurcation, and to be free of involvement. The right postero-anterior bronchogram is entirely normal (figure 9).

This case, from the evidence presented by the bronchograms alone, should represent an ideal one for left lower lobectomy for localized bronchiectasis. However, the coexistence of asthma and emphysema with marked pulmonary insufficiency, evidenced by marked exertional dyspnea, made a conservative course seem wiser. The patient, who had obtained limited benefit previously from the usual antiasthmatic measures, showed distinct and dramatic response to a relatively small dose of nebulized penicillin powder (100,000 units per day). Wheezing and cough diminished at once; moderate exertional dyspnea has persisted, reflecting the degree of emphysema present. In the past year the patient has had practically no asthma, no chronic cough and postural drainage test is negative. He raises a small amount of sputum each morning on postural drainage.

This case serves to emphasize that a given individual may have, and frequently does have, several chronic diseases of the lungs, and that bronchography's principal function is in the detection of bronchiectasis and determination of extent of involvement, and that bronchography is but one additional diagnostic tool in the study of chronic disease of the lungs. To be of the greatest value, it must be used only in conjunction with clinical evaluation of the patient and other special diagnostic procedures.

SUMMARY

1. Indications, contraindications and reactions in bronchography are discussed.
2. The present status of water soluble media in bronchography is outlined.
3. A simplified method of obtaining bilateral bronchograms is reviewed.
4. A case report is given, emphasizing the role and limitations of bronchography in evaluating a patient with chronic disease of the lungs.

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Routine Photoradiography in a General Hospital

Its Place in Detecting Unsuspected Pulmonary Tuberculosis

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Routine photoradiography is a good means of discovering the significant, but unsuspected, lesions of pulmonary tuberculosis. We have not yet learned how to define "significant lesion" for many reasons. The vagaries of tuberculosis are such that some lesions undergo spontaneous arrest without the attention of the physician or of the patient while other lesions will evolve rapidly with progressive disease and ultimate death. Except in retrospect we do not know how to differentiate these lesions nor do we know whether such a differentiation has not been foreordained; its evolution may depend much more on the aggregate of those many factors which we term "resistance" than on the composition of the inflamed tissue. It is well to recall the old adage "it is more important to know what kind of man has a disease than to know what kind of disease a man has." With a reasonable degree of certainty, we know that any unhealed infiltrate is potentially devasting tuberculosis. We therefore must search out that lesion when it is in the earliest detectable aspect. For this reason, the objective of all case-finding studies may be said to be the search for the progressive and previously unsuspected lesion of pulmonary tuberculosis.

As a case-finding measure, routine photofluorography has ceased to be a novelty. Very little is to be gained by merely enumerating suspects, such as nontuberculous disease. Such a study is worthwhile today only for comparison with other measures of finding the early case of tuberculosis and for determining whether a given technic finds the case of tuberculosis quicker, cheaper and more effectively than do other means. This is a study of 350,000 70 mm. photofluorographs made on a stationary unit in the Chest X-ray Unit at the Charity Hospital of Louisiana in New Orleans between January 2, 1946 and November 15, 1951. It represents an attempt to evaluate routine photofluorography of all persons applying to the dispensaries, the emergency services and to the wards of a large general hospital in a metropolitan area where virtually every type of illness or infirmity known to man is encountered.

Comparatively little attention has been directed to the obvious advantages of taking an x-ray film of the chest of each person entering a general hospital. This procedure is not new;[1] in fact it is older than many of the technics which we have already outgrown. In 1925 Ralph Kinsella and his co-workers introduced routine admission x-ray films of the chest of all persons admitted to St. Mary's Hospital in St. Louis. They found that routine x-ray revealed more significant disease than did routine urinalysis and Wasserman testing. Many other similar surveys have been conducted. In the Meyer Memorial Hospital of Buffalo after a period of two years, the uncorrected figure for unsuspected tuberculosis was 3.7 per cent. When corrected by postmortem findings and by positive sputum examinations, the figure had dropped to 1.8 per cent. At least 2.5 per cent of all new patients were proved to have pulmonary tuberculosis of significant clinical value. Because of the expense of the conventional x-ray technic, comparatively few hospitals were willing to follow the lead of these pioneers. With the advent of the more economical photofluorography, many of these objections disappeared. For example, using the 70 mm. technic, Golley[2] found 3.7 per cent of 5,187 routine admissions to have tuberculosis and of these 92 per cent were minimal. These observations indicate a greater "yield" of tuberculosis than in the population at large. Christie[3] found that of 500,000 persons examined in a Washington, D.C. survey 1 per cent had definite tuberculosis and 1.4 per cent had suspected tuberculosis, but his figures do not indicate how many had what clinicians would call "active tuberculosis."

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Obviously people who are sick and come to a hospital for relief are more apt to have tuberculosis than those who merely come for a film to a trailer, attracted there by the blare of a loudspeaker or urged by the moral suasion of an employer. For example, the incidence of suspects found in those examined at the Charity Hospital varies between 2.37 and 4.2 per cent. At the same time, surveys of the population at large in New Orleans showed that approximately 1.5 per cent of all surveyed were suspected of having tuberculosis. That suitable selection will increase the yield of suspects is indicated by the fact that inmates of the Parish Prison averaged 4.26 per cent suspects. Many persons belonging to special groups may be difficult to collect for a survey, but they eventually go to a hospital for medical attention. Not only are hospital surveys apt to show a higher incidence of tuberculosis, but also they are apt to show a greater incidence of advanced disease. In most surveys, about 80 to 85 per cent of all active cases are minimal: in this study only 28 per cent were minimal, 31 per cent moderately advanced, and 41 per cent were far advanced.

Hospital detected suspects are easier to study. It is comparatively easy to obtain a large film quickly on the suspect who is already on the wards of a general hospital or who returns for a routine clinic visit without having to explain why the second film. The emotional trauma which appears to be occasioned by request for re-examination is obviated. Anyone experienced in surveys knows the anxiety and mental turmoil of some persons being asked to return for study. On the contrary, anyone going to a hospital these days expects x-ray films and other tests; consequently no special effort is needed to have him fall in line for his repeat x-ray film. The cooperation of the patient does not often have to be solicited and one avoids emotional peaks and valleys. Obviously, one cannot diagnose tuberculosis from the x-ray film alone. The tuberculin test,[10] sputum examinations and, occasionally, bronchoscopy may be needed to determine the precise nature of the abnormal shadows detected on the roentgenogram. These procedures are most easily accomplished while the patient is still in the hospital.

Hospital surveys find the active case more cheaply than do the other technics. We have talked loud and long about the economy of case-finding studies when we know so little about the actual costs. In a hospital survey the cost is chiefly that of developing and interpreting a film; in the field there are these costs, of course, but clerical costs are greater and there are additional costs of health education and of follow-up. In the average survey, using a mobile bus, it is necessary to prepare the way with a costly health educational effort. No one can doubt the value of health education in general, but is it accomplishing its purpose when conducted solely as a part of a survey? That it is not safe to depend on the results of a health educational campaign is indicated by the studies of Galliher and coworkers[4] who concluded that during a roentgenographic survey people's ideas about tuberculosis did not change materially even though their ideas with regard to roentgenographic studies did. The improvement in people's knowledge was slight indeed, amounting to about 2.3 per cent. The fact that persons with tuberculosis in their families improved in knowledge regarding tuberculosis emphasizes the receptiveness of this group.

Zacks[5] estimates that the cost of a small film is 70 cents but does not indicate how this figure was reached. It is not very helpful to compare figures for one portion of the country with those of another for the obvious reason that there are tremendous regional differences. It is feasible and economical to take a film on anyone who comes to the hospital for some medical reason. The illustrative chart is published only as a target because so little has been written to help decide whether a given program is spending the taxpayers' dollar to the best public advantage. It is by no means intended to discourage the use of x-ray trailers or bus facilities to mobilize the population for tuberculosis screening. It is presented to indicate that any general hospital, whether large or small, can make use of some x-ray procedure on all patients admitted for medical attention. As was recently pointed out by Morgan,[6] a small hospital can perform routine photofluorographic examinations almost as economically as a large hospital.

COMPUTED DAILY EXPENSES OF PHOTORADIOGRAPHY

Depreciation: Cost of equipment, $10,000.00	
Life, 8 years	$ 5.48
Administration and housekeeping	2.40
Technicians:	
3 (total monthly salaries $625.00)	28.41
Tube replacement:	
(tube good for 20,000 exposures)	12.50
Chemicals:	
(2 gallons developer, 2 gallons fixer)	3.50
Maintenance of x-ray equipment	4.00
Cost of 70 mm. film used	12.75
Professional services for interpretations	11.36

Clerical assistance	24.09
Health education	none
Total for 350 frames (daily average)	$104.55
Cost of a single frame of 70 mm. film	29.8 cents

Hospital surveys shorten the time interval between diagnosis and therapy. A patient in a general hospital whose tuberculosis is discovered by routine x-ray film can quickly be transferred to the tuberculosis division of the hospital or to a sanatorium. As this study shows, 29 per cent of suspects were in the minimal stage when the diagnosis was made for the first time, 33 per cent were moderately advanced and 38 per cent far advanced. It is disappointing not to have found a higher proportion of minimal lesions, but it must be remembered that this is a survey of sick people. Inspection of the existing cases in the tuberculosis division of the Charity Hospital[9] indicates that with monotonous regularity they were admitted because they were sick enough to need medical attention. Practically all of them were far advanced when admitted and had had symptoms for several months before the diagnosis had been established. A number of them had been diagnosed by routine photoradiography when applying to the hospital for some other medical condition. Others, not diagnosed in this fashion, had to wait one to three months before a bed was available.

Every general hospital can and should have an isolation unit for the protection of patients and personnel. The relatively small inconvenience entailed is more than offset by the protection offered and the elevation of standards of medical care provided. This is perhaps one of the most difficult ideas to put across; that it is possible to isolate effectively in a general hospital without elaborate facilities. Unfortunately we are the victims of our own propaganda; most nurses and physicians fear tuberculosis and believe that tuberculous patients in a general hospital will be a menace to other patients and to the staff.[7] The institution too small to have a separate isolation wing can designate one or two rooms for this purpose; and even the ordinary private room of a hospital can be suitably arranged for a contagious disease technic if this is intelligently planned and meticulously followed.[8] It is time that we insist that each patient with a suggestive pulmonary lesion have repeated sputum examinations until it is possible to declare with a reasonable degree of assurance whether the patient is disseminating tubercle bacilli. If he is, he should be placed in isolation, but he should not be regarded as a social pariah. If more of our physicians understood the pathogenesis of tuberculosis, they would understand the value of isolation and would be able to transmit to nurses the safety of using ultra-simple methods of preventing sputum dissemination. Many student nurses and interns obtain comparatively little training in the practice of an isolation technic; such experience is an integral portion of their education. Experience with tuberculous patients is essential to a logical and well-ordered understanding of internal medicine in general and pulmonary diseases in particular.

The traditional attitude of general practitioners toward tuberculosis and tuberculous patients has changed greatly. Formerly they were reluctant to treat patients with tuberculosis and insisted on referring them to a tuberculosis institution as soon as the diagnosis had been established, realizing quite well that for many patients this was an impracticable prescription. With the advent of antibiotics, many practitioners are now accepting for treatment patients whom formerly they would have rejected. To assist in beginning therapy, it is essential to have adequate hospital facilities. The general hospital can render great service to the community in making it possible for these cases to be started on therapy in an isolation room of a general hospital.

The more vigorous surgery of the present day has opened a new era. Surgeons are boldly opening the thorax much more than in former years. No one can understand even the beginnings of thoracic surgery without an understanding of tuberculosis. With even a small isolation unit, it is possible to perform excellent thoracic surgery. The tempo of our surveys in large cities will mean that many persons will inevitably submit to thoracic surgery for the otherwise undiagnosable thoracic lesion. Some of these lesions will be tuberculous and will require the use of an isolation unit during surgical convalescence. Other lesions, frankly tuberculous, will be treated by thoracoplasty or by surgical resection. For such it is essential that the hospital have an isolation unit.

CONCLUSIONS

Any general hospital, no matter how large or how small, can utilize any of the available photoradiographic technics to detect tuberculosis among its patients. Such a procedure will find tuberculosis more cheaply and provide therapy more quickly than do other forms of survey.

(Continued on page 226)

Emotional Problems in Tuberculosis*

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EMOTIONAL PROBLEMS in tuberculosis may be defined in the usual terms of their consequences: that is, how many patients leave against advice and how many have serious emotional symptoms. Statistics show that approximately one-third of the tuberculosis patients in this country are leaving sanatoria against medical advice,[1] and in some reports nearly one-half of these have positive sputum. In July 1947, 62 per cent of tuberculous veterans leaving against advice had far or moderately far advanced tuberculosis. Irregular discharge rate of tuberculous patients in Veterans Administration hospitals has been as high as 72.5 per cent and the lowest rate was 52.2 per cent in 1922.[1] Every time a patient leaves against advice, he jeopardizes his health and life and often spreads the disease. With more beds available, waiting lists become smaller, more patients may remain in hospitals longer. But the more reluctant the staff becomes to release patients, the more they may leave against "advice". In England, with long waiting lists, few beds, and rapid turnover, few leave against advice. Much, therefore, depends upon the definition of "advice".

CAUSES OF IRREGULAR DISCHARGE

The majority of patients who leave against advice do so because at some time doctors and nurses have failed to understand them as sick people or to offer them the care they deserve. Regardless of the immediate explanation of their discharge, the real reasons may not be the ones given. Many of these patients' symptoms are not in the somatic but in the psychosomatic or somatopsychic sphere and are more directly related to psyche than to soma. Adequate economic assistance to their families coupled with understanding of the psychologic aspects of the cure would probably make the number of patients leaving against advice relatively insignificant. Like a child, the chronically ill patient detects the feelings of those who care for him and he cannot readily be deceived.

THE DIAGNOSIS

What do we mean by the emotional *problems* of the tuberculosis patient? First there is the matter of handling the *diagnosis* of the disease itself. The first and most important man whom the patient sees is the general practitioner or specialist at the moment of diagnosis. The manner in which he presents the diagnosis, and the understanding with which he explains the situation, is crucial in the patient's psychological adjustment. The sharp meaning of the word *tuberculosis* can be only slightly dulled, and to speak of a "spot on the lung" is a deplorable euphemism; the avoidance of explaining what sanatorium care is and how long it lasts leads to later resentment and often rage. The sanatorium should be described as it really is, a hospital where sick people are sent to get well, a necessary step in regaining health. The pamphlet *I Never Asked for This*[2] is an excellent one to give to patients entering sanatoria. It would be preferable if each hospital had its own printed version with a message from its own staff.

When a patient hears the diagnosis of active tuberculosis he is afraid, and believes his existence may be threatened. The recommended cure precludes both physical fight and flight. It is strange, therefore, that so many (about 35 per cent[3]) accept this adversity with apparent indifference. This seeming unconcern may be a defense against actual overwhelming fear. The problem of adjustment to tuberculosis begins at the moment of diagnosis, and solution depends not only upon the experience, judgment and confidence of the diagnosing physician but also upon the person receiving the diagnosis.

PATTERNS OF RESPONSE TO DEPENDENCY

The second problem of adjustment is the individual manner utilized to compensate for an enduring handicap, conditioned by some peculiarities of the tuberculosis situation. It involves the handling of childhood conflicts and use of *earlier techniques* the patient had learned and relied upon in the outside world. Parents who have given their children the feeling of belonging, of being wanted, respected, loved and, to a degree, protected; parents who are casual, not overly rigid or cruel; parents who have permitted their children to express normal hostilities, resentments and occasionally rage against the world around them; parents who have unselfishly required respect—all such have helped their children to meet tuberculosis or other handicaps in later life.

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*An abridgement of an address given before various state and county tuberculosis associations at their annual meetings, during 1950 and 1951.

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The third problem is that of the *environmental* demands of the cure. The patient's first struggle is to accept the role of a dependent. Then, after a period of acquiescence, he must again struggle, this time for independence in preparation for return to society. *Dependence* upon this environment and its administration requires control of hostility and loss of freedom and, what is particularly disturbing for the male, loss of all aggressive action. He often accepts the hospital rules as he accepts tuberculosis, resentfully and submissively. He is separated from friends and family; beset by worries and anxieties; death is an ever-present reality.

He is in a strange environment where he is more often told what not to do than what to do; isolated among those who are contagious; placed with people whom he might not choose for friends. He strains for the day when he can once more enter into society; all this in a stream of *activity* of doctors, nurses, friends and relatives; all of this interpreted by himself in his intensely personal world of crumbling independence. Whether the patient is rebellious or apathetic, whether he accepts his regression to childhood or whether he is in constant turmoil, he quite probably does not know why he behaves as he does.

The emotional problems of adjustment in wards of more than four beds increase far beyond the mathematical proportion of the number of patients. It is almost impossible to get people of comparable social strata and interest together, and it is almost impossible to get people with the same degree of tuberculosis together. Moreover, the sensitivity with which the sanatorium administrative personnel change patients from an unsuitable to a more suitable room, their ability or willingness to change them, or even the patient's courage to express a desire to change, is often very slight. This is bad.

Of course, some patients prefer to be with other patients. Not every one should have a single room, but many would be benefited who cannot now be so accommodated. Large wards, often with from 10 to 30 or more patients, engender much emotional unrest. A sanatorium should have one-bed and two-bed rooms, with three-bed and four-bed wards as necessary, but nothing larger. Some existing large wards could be divided by partial partitions into cubicles.

THE SANATORIUM CONSIDERED AS AN ISLAND CULTURE

The sanatorium may be regarded as an *island* —a unique culture—where the population resides in voluntary and temporary exile, where visitors come by boat from the mainland at regulated hours and the inhabitants leave only when granted passes. The inhabitants rarely use their feet as a means of locomotion except just before they leave. For the most part the population is wheeled in chairs or carts pushed by other people. The nature of communication between the inhabitants is unique, and the manner of speech, humor and topics of conversation indigenous to this society.

All of the population bears a unique similarity in its illness problem, which is usually invisible and painless. The members must face similar problems of adjustment to common treatment situations, and their responses are predictable to a large measure if one will take into consideration: (1) the individual and the group, and (2) the particular island in the archipelago of tuberculosis sanatoria where he finds himself.

ATTITUDES AND THE PSYCHIATRIST

The fourth problem is that of *staff attitudes.* We can define what we have and what we think we have. *What we have* is Sanatorium A, B or C, with a definite discharge rate, irregular discharge rate, mortality rate, patient turnover and numbers of obviously complaining or non-complaining, trouble-making or non-trouble-making patients. These can be expressed in statistical columns for analysis and comparison. But when we ask ourselves what we *think we have,* a new ingredient which cannot be easily quantitated enters in. We think we do a good job, we think we do or do not understand our patients, we think a patient is "recalcitrant", we think our rules and manners are adequate or proper or partially so. We think we are doing the utmost often with limited means, but are we? Every physician should read Bartmeier's paper[4] on the attitude of the physician.

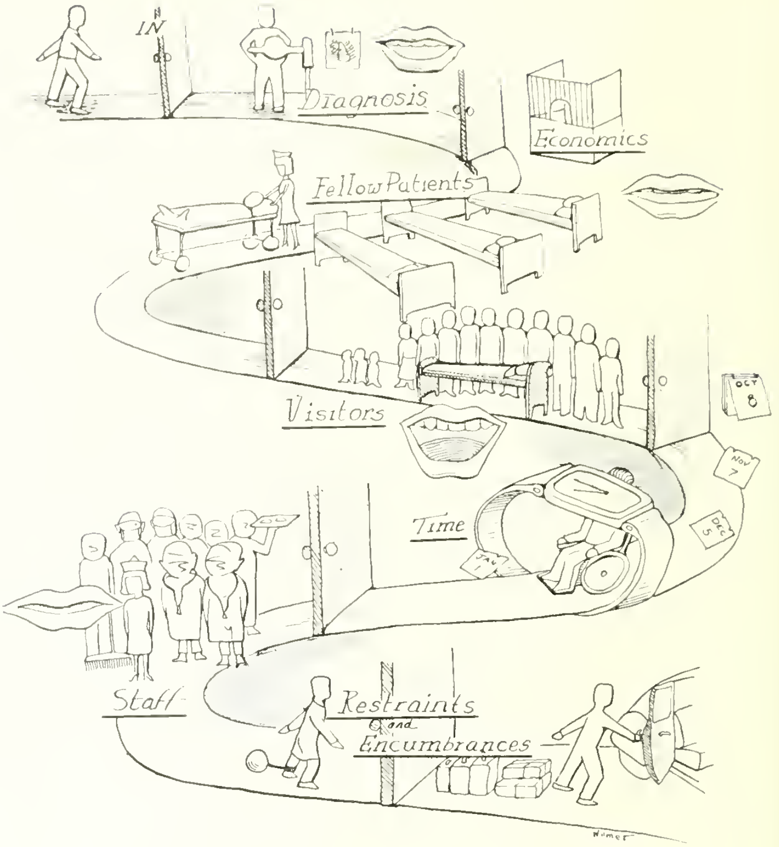

Figure 1. The patient's journey through the tuberculosis sanatorium cure and the most important people and situations he encounters from a psychologic viewpoint. (1) Diagnosis and how it is given; (2) Economic repercussions; (3) Fellow patients, attitudes, roommates and non-roommates; (4) Visitors, with the exclusion of children; (5) Effect of time in the cure and on the person's life; (6) Staff attitudes and services; (7) Restraints and encumbrances, their acceptance and final release, the acceptance of dependence at first and finally independence and freedom.

What we have is a definite hospital environment, so many *individual* patients and so many *groups* of individuals whose group identity we may or may not recognize. We are, we must be concerned with *what is wrong with what we have* and *what is wrong with what we do.* And in the latter extension of the problem the psychiatrist has a role to play. The sanatorium is not his problem; he can counsel and help but never take over the indispensable human role of the physician in charge. For one thing, the sanatoria in this country are usually remote from good psychiatrists. Further, it would be difficult to interest or pay enough psychiatrists to carry their work into the majority of sanatoria. Moreover, most psychiatrists are, by nature of their training and experience, almost exclusively oriented to the individual and his neuroses, frustrations and adjustments. It is quite possible that in the sanatorium-tuberculosis patient problem, orientation of the individual is secondary to orientation to *groups* and new methods of ameliorating stresses and tensions.

In this area of preventive psychiatry he is, by experience, more at ease. One might think of the problems of the sanatorium as an exercise in social psychiatry. It always filters down to individuals, but the economics of the social group approach compared to the individual approach is at once challenging and promising. To think predominantly about the individual is to think of who is "good" or "bad" or "recalcitran" or "non-recalcitrant"; at least a great deal of the literature would lead one to believe this to be the case. To think of individuals within groups leads to the study of the phenomena of *acculturation* to illness. One might question if we do not neglect the individual by such an approach . . . are we not looking away from the revered "total personality," but I feel the best approach to this personality may be through the group approach. We are here concerned primarily with *relief* of anxiety and *amelioration* of fears and apprehensions, and not the complete relief of maladjustment and psychiatric cures of neuroses, with their attendant mobilization of anxieties which may have a destructive effect in such a serious disease as tuberculosis, held often in the precarious balance of resistance.

DOCTOR-PATIENT RELATIONSHIP

The attitude of people toward those who are ill plays a great role. Doctors and nurses can create unrest and hardship, precipitate or create neuroses or prevent them. Anxiety in the patient may be transmitted to the doctor just like an infectious disease. A nurse's or doctor's concept of the "good" patient may be the vegetablelike dependent person with childlike faith in father or mother. Such docile overdependence is as undesirable as is open rebellion. The real significance of excessive docility may be manifested by a sudden unexplained drunken spree or abrupt departure against advice. Strict obedience may be flattering and may make ward life simpler, but it is unrealistic, unwise.

The patient-doctor relationship has always been a sacred part of medical practice. This sometimes intangible ingredient is most commonly cited by physicians as inherent in our type of medical practice and threatened with destruction by socialized medicine. We must never lose sight of it but we must recognize the needs for improving it in our type of medical structure, and not always assume it is there. It is present in shades of gray as well as black and white. One way of destroying it is for the physician to assume or take upon his shoulders certain extra-medical legal or quasi-legal cloaks which he can reasonably avoid. I have in mind the incarceration of rebellious patients in locked wards in the tuberculosis sanatoria. Note, I say *in* the sanatoria. The effect of such prison wards on hospital morale has not been studied but does exist. More important, however, it changes the role of the physician to that of warden. Depending somewhat upon the individual physician and the use he makes of health department commitments of "recalcitrant" positive sputum patients, it may have a devastating effect upon the sacred patient-physician relationship.

A physician of my acquaintance once told me when he was faced with a rebellious patient he used the simple expedient of adopting an attitude of anger and infuriation, swearing if the patient was a male, being more subtly dominant and aggressive if a female. He pointed out that however improper this may seem to a psychiatrist, it worked. The majority of patients thus anger-confronted stayed and seemed subdued. Out of curiosity one day I talked at length to one such patient who had been transformed from "bad" to "good" by the almost ritualistic outburst. The greater portion of his controlled conscious tension was no longer related to his disease or his environment but to this doctor.

This may be an acceptable attitude for a psychiatric patient occasionally to have toward his psychiatrist, but here the psychiatrist is aware of the attitude and works with it. Part of this physician's ritual, however, included the denial of such a reaction, or if acknowledging it in part, never discussing it but continuing to act the dominant hated role. It is a serious question how efficient a physician can be as one who must minister to the ill, be their confidante and, occasionally, friend, in this assumed role. It is quite possible that under these circumstances the more mature patients become the irregular discharges.

Enlightened people rarely speak of problem children—they speak or think of children with problems. Similarly, problem patients become patients with problems. In one case we can attack the problem, in the other the patient or the child.

THE RECALCITRANT PATIENT

Thus the fifth problem is that of the individual patient's normal feeling of rebellion against the sanatorium's demands. It is hidden or open. It is the problem of patients who leave against our advice and are often called "recalcitrants". Actually some leave because of psychopathic personality, character neurosis or schizophrenia, others are mentally defective or alcoholic or are motivated by other psychoneurotic obsessions. Some patients will probably require legal restraint in hospitals. The majority, however, leave for these reasons: they have not been able to accept the role which they are called upon to play; the doctor or nurse has not been able to help them accept their treatment; their friends or family have not been able to help them accept it.

Patients who leave against advice are rarely recalcitrant, even within the meaning of the term. I have never seen a patient whom I would classify as recalcitrant. It is, perhaps, a matter of semantics and definition, but when the word is employed it becomes a loosely used term covering a variety of real and imagined sins. They break our rules: how good are our rules? The word being descriptive of their action is not a "satisfactory label." It does not define the etiology or pathogenesis of the malady.

The logical consequence of this state of affairs would seem to some to be barred and guarded wards, and court commitments. Discipline or legal confinement should not be required at this time because of our failure properly to handle tuberculous patients. If one-third of patients leave against advice, certainly the circumstances should be investigated and the total hospital situation accordingly improved. Locked wards may sometimes be necessary outside of the confines of the sanatorium. To my mind they are never necessary within the confines of the sanatorium considered as a therapeutic community. The history of locked wards in sanatoria is that they are subject to abuse, or if in a few instances not actually abused, they present the nucleus for abuse and being an integral part of the hospital administration, may subsequently be subject to abuse by less competent men and women.

We must be careful to avoid severe restrictive measures in the name of illness, and are accountable for our transgressions if they are such. Patients who are rebellious and "recalcitrant" because of psychosis, character neurosis, chronic alcoholism, belong in hospitals where such people are treated or in especially established wards outside of the immediate sanatorium buildings. In the culture concept it is our desire to define sanatorium cultures, not to mimic other cultures; because there are prisons outside does not justify prisons inside. In some measure this approaches the police state society, and it is difficult if not impossible to imagine such facilities operating or necessary in such a democratic society as our group culture organization. The presence of patient-councils, patient-government organizations are interesting phenomena but fundamentally represent reposing certain very limited powers in a highly select group, which is quite different from our approach.

SUGGESTIONS FOR MEETING THE PROBLEM

In the actual day by day operation of sanatoria, more part-time psychiatric consultants, more democracy, less regimentation are needed. Matters of concern to patients should be faced squarely and without deception, and the patient be given an opportunity to talk to his physician alone from time to time. Obviously, the greater need is to attract the most capable and mature physicians into the field of the care of the chronically ill.

There is need for orientation in medical and nursing schools, and in postgraduate courses for physicians and nurses. There is need for more social workers, psychiatric social workers and well trained specialists in the disease. If the psychiatrist becomes a member of the tuberculosis team, the tuberculosis physician must continually guard against delegating emotional problems solely to the psychiatrist. The psychiatrist can help, just as the pharmacologist can help with streptomycin in tuberculosis, but the specialist cannot assume the responsibility which belongs to the man in the front line. The first man is usually the family doctor.

Psychiatric records contain confidential personal data, and they should not be a part of the hospital records. A brief summary is adequate, and the detailed notes should be kept in a locked file. A feeling of the right-to-know seems to motivate some doctors and nurses. The only person who has a right to know all the details is the person to whom they are confided, and what is discussed in conference must be chosen with great care. Moreover, pains should be taken to imbue all conference listeners with the confidential nature of the material which may be discussed.

How should the *general physician* handle these problems with the patient? First, by listening, that is, by simply sitting comfortably and listening without impatience as a patient unburdens himself. This is often sufficient, since it is catharsis and can be combined with reassurance. Allow the patient to talk, to express his feelings of anxiety and depression without offering platitudes in return. Seriously and chronically ill patients will sense at once the slightest dishonesty or deception. Overcomplacency or overdefiance should not be encouraged. Interpretations and reassurance are offered only where well founded.

Treatment and our care must be fitted to the patient insofar as possible, and at the same time, the patient is expected to fit himself to the treatment when it cannot be personalized. Patients with tuberculosis are neither happy nor optimistic as a result of tuberculosis. Examples of the so-called *spes phisica*, the pathologic euphoria, of those *dying* of tuberculosis are similar to optimism or euphoria found in patients dying of cancer, multiple sclerosis, Hodgkin's disease and other malignant disorders. Laughter of the tuberculosis patient is often almost hysterical and may serve to hide tears. Laughter and smiles are defenses against dangerous fears. Some fundamentally cheerful people who have tuberculosis rebound from depression and are once more cheerful.

GROUP THERAPY

We may think of groups or blocks of people, but the group is made up of individuals—solitary, lonely men and women walking a dangerous path. Whether or not they choose to think of themselves as solitary or lonely is quite beside the point, or, indeed, whether they recognize the dangers or close their eyes does not alter the nature of the journey but only their attitude, their manner of speech, posture and appearance. It is more difficult to cling to an unrealistic reaction or to be frightened by an overmagnification of real danger in the interchange of a group.

We have developed a method of working with groups within this society toward the improvement of acculturation to the illness and its environment. These groups include (1) weekly sessions of 10 to 12 patients with a psychiatrist leader, over a period of two to three months; (2) monthly group sessions of the entire medical and nursing staff, conducted by the psychiatrist; (3) monthly meetings of groups of visitors for 45 minutes after visiting hours for four sessions, conducted alternately by a nurse and a doctor; (4) monthly sessions of all aides and custodians (orderlies) led by the superintendent of the hospital; (5) monthly sessions of the entire hospital population which would be capable of attending a movie, together with the whole professional and nonprofessional staff, led by the psychiatrist; (6) "Owl" group (AWOL) a modified "AA" attack on the irregular discharge problem. This is an organization of patients who have left or wanted to leave against advice, who try to prevent others from making their mistakes. This group has no leader, is relatively amorphous and responsible to no one but themselves; (7) "Inside Out Club," being a social group meeting in a nearby town once fortnightly (not yet in operation but modeled after the clubs in London for patients recently from psychiatric hospitals).

The culture of our sanatorium is being altered. The attitudes of the staff and patients, the families and the aides are being changed. There must be a mature medical and nursing staff to begin with, for they must look within themselves, realizing that they, as well as their rules and methods, are alterable. This also implies a portion of healthy sophistication. Often common sense, that commonly used and misunderstood phenomenon, is more than adequate to meet situations.

SUMMARY

1. Failure to understand and to handle the emotional problems of the tuberculosis patient is an important factor in high incidence of irregular discharge.
2. There is need for more psychiatrists, social workers and psychiatric social workers in tuberculosis sanatoria.
3. The patient faces the emotional acceptance of a dependent, childlike role in a sanatorium society described as an island culture.
4. The attitudes of the physician and nurse are of great importance and commonly overlooked or never considered.
5. There is need for understanding patients as people and adjusting sanatorium care to everyday human needs of the patients: "The care of the patient begins with caring for the patient."
6. Group psychotherapy offers help to the tuberculous patient.
7. The physician and nurse must be aware of the patients' inner feelings of insecurity and anxiety, the implications of professional authority and of the regressed state of the patients.

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The Tuberculin Test as an Evaluation of the Future of Tuberculosis

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THE EVALUATION of the present status of tuberculosis in regard to possible eradication can be approached from many angles. The time-honored method of observing the death rate provides a definite idea as to the progress against tuberculosis over long periods of time. As a matter of fact it is still our most used method. However, it holds possibility of error, such as failure to report all cases that die of tuberculosis, and faulty keeping of records. Because of poor diagnosis the per cent error is quite difficult to determine.

The morbidity rate is another method of determining how the fight against tuberculosis is going. Reporting of the cases of tuberculosis in a community has a great many drawbacks. For example: the exact definition of a reportable case, whether it is an active case, whether it is an old healed case, whether it is really tuberculosis and not some other disease that resembles it. If we use the criterion of acid fast bacilli in sputum before a case is to be reported the morbidity rate will be quite low. If we report all cases that are suspicious on x-ray film inspection the rate, of course, will be higher. Are all cases found really reported? Since the greatest number of these cases are found by the physician in private practice, it would be well to note just what kind of case is being reported by him. It is a known fact that those with positive sputum test are usually reported. Certainly few if any negative sputum cases are reported.

There is a discrepancy between mortality and morbidity rates. Although the death rates have been going down, the number of cases reported have increased. Since the deaths are from the known cases, there is some reason for this obvious contradiction. It is felt that x-ray film surveys have led to cases that have previously not been known, but the actual positive sputum cases are directly in proportion to the deaths reported.

In table I it will be noted that the number of deaths in Illinois have shown a definite reduction from 2,657 yearly to 2,215 yearly, a dropping off from 32.0 per hundred thousand to 25.3 per hundred thousand. When we examine the morbidity rates, we note that despite the falling death rate the number of cases reported shows an increase from 6,982 in 1948 to 7,956 in 1949.

TABLE I

	Tuberculosis Deaths		*Tuberculosis Cases*		
	No.	Rate	No.	Rate[1]	Population[3]
1948	2,657	32.0	6,982	84.2	8,291,095
1949	2,518	29.6	7,956	93.5	8,512,686
1950	2,215[2]	25.3[2]	7,630[2]	87.4[2]	8,731,697

[1] Per 100,000 estimated population at midyear

[2] Provisional Figures

[3] Estimates adjusted to the 1950 U. S. census

[4] Data reported by Illinois Department of Health

Are we then to assume that the falling death rate is only temporary and that ultimately it will catch up with the morbidity rate? The answer will be obtained by considering other data.

Since tuberculosis is not hereditary, we can safely say, "that as long as a person is not infected" by tubercle bacilli, there is no possibility of his developing tuberculosis. The method of determining whether a person has been infected is the tuberculin test which is accurate and does not have the drawbacks of projected inconveniences, etc., as the reported cases of tuberculosis. The test properly done and interpreted is accurate in a high percentage of cases. I wish to report a comparison of the number of students who were reactors in the same age group, in the same high school, in different years. Table II shows that in the years 1933 to 1935, 31.94 per cent reacted, while in 1948 to 1951 only 7.01 per cent. In this way, with

TABLE II

	Number Tested	Number of Reactors	Percent Reactors
1933 to 1935	27,363	8,740	31.94
1948 to 1951	40,317	2,825	7.01

(Continued on page 225)

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Report of Committee on Tuberculosis, American College Health Association

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THIS REPORT is a summary of the meeting of the Committee on Tuberculosis of the American College Health Association at which were appraised the results of nearly 20 years effort in tuberculosis control among our college and university health services. There was unanimous agreement that the annual study of tuberculosis control programs should be continued and reports made thereon, because: (1) they serve as an excellent medium for education in tuberculosis as it pertains to the college age group, (2) they stimulate interest on the part of many colleges to develop such programs, and (3) they provide an index of trends in tuberculosis control in young people of college age.

A lengthy discussion grew out of some just criticism of certain of our past methods of study. Statisticians have asserted that the detailed questionnaires which have been used have not provided figures that were statistically significant and, since the forms were often filled out by persons with little knowledge of the tuberculosis program, contained numerous errors. The committee has, however, always been of the opinion that publication of the results of our annual survey has served a useful purpose, for reasons already mentioned.

It was discovered that most of the practical information required for the annual summaries and reports could be obtained from the use of reply post cards. By this method we learned, for instance, that in 1949-50 more colleges than ever before—500, as compared with 448 the previous year—reported case-finding programs. We also learned the number of institutions which were using the tuberculin test, the x-ray alone, or a combination of both in their screening process. We shall continue to use this post card method for our annual study.

We are convinced that in addition to furnishing evidence of the importance of tuberculosis control on the campus, we can and should contribute to the scientific knowledge concerning this disease, especially its epidemiology. It was decided, therefore, to explore the possibility of establishing a research program in which a selected group of colleges and universities, having a program suitable for study by scientific methods, would be asked to participate. The suggestion was made that funds for such a study might be obtained from some interested organization—the American Trudeau Society, for example—and that it be set up as a problem for a candidate for the master's or doctor's degree, the candidate to have special skills in research and a background in public health.

The committee also made plans to enlarge and intensify its other educational efforts. Attention was called to the great variety of sound educational material available from state and local tuberculosis associations. Pamphlets, charts, slides, filmstrips and motion pictures can be obtained without charge from local associations. Some of these, such as "Diagnostic Standards," and "Is It TB?" are prepared especially for physicians. Others, such as "What Is Tuberculosis," can be used as teaching aids by the health service and in the class instructional program in your college.

The report of our Third National Conference on Health in Colleges, entitled *A Health Program for Colleges,* is still available,* and its wider use was urged by members of the committees. The recommendations of this report, as timely today as they ever were, deserve the careful consideration of every college health service director. The committee suggests that members of the student health services prepare articles describing good tuberculosis control programs on their various campuses, for publication in appropriate professional journals. Reprints of these articles will then be made available to all colleges throughout the country.

The committee urges that the discussion of tuberculosis be considered in programs of local section meetings of the American College Health Association. Papers presented at these meetings should also be submitted to appropriate journals for publication and reprints made available.

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*Available through the National Tuberculosis Association.

Prolonged Intercostal Nerve Block In Upper Abdominal Surgery

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Atelectasis has been recognized[1] as the leading pulmonary complication following upper abdominal surgery and a primary condition in the development of postoperative pneumonia. Loss of ability to cough effectively following upper abdominal surgery is a significant predisposing factor. Secretions which are normally removed by cough and ciliary action remain in the lungs to produce a lobar or lobular obstruction.[2] Unless vigorous measures are applied, the microorganisms of the upper respiratory tract invade the collapsed area resulting in more serious complications.

The many pulmonary complications following upper abdominal surgery have been attributed to hypoventilation due to limited respiratory excursion which, in turn, is a result of postoperative pain.[3] Kahn[4] demonstrated that stimulation of the central end of any intercostal nerve causes a reflex inhibition of respiration. This also holds with a stimulation of the peripheral branches, including those to the rectus abdominus muscle. A significant decrease of pulmonary ventilation following upper abdominal surgery has been repeatedly reported by many investigators.[4–9] This respiratory inhibition has been shown[3] to amount to approximately 60 per cent depression of the mean vital capacity during the first few postoperative days. Churchill and McNeil[5] found that 25 per cent of preoperative vital capacity was present 24 hours postoperatively and Powers[8] reported this value as 33 per cent in his series.

Although many methods have been advocated for reducing the stimulation of the intercostal nerves, most of them were found wanting. The approach has been two-fold: the first directed at placing the incision in such a fashion as to interfere with as few sensory nerves as possible; the second approach directed at the control of postoperative pain through local infiltration of anesthetic solutions. Crile[10] advocated injection of the abdominal wall with quinine and urea hydrochloride. Cappelle[6] recommended continuous infiltration of the wound area with procaine solution. Gius,[2] Starr and Gilman,[7] Zollinger,[11] Belinkoff,[12] and Graham, Seldon and Priestley[13] reported their observations of the intercostal nerve block with local anesthetics.

While this last approach appears to hold much promise, the anesthetic solutions used had many limitations. The anesthesia produced by the short acting aqueous preparations did not last long enough, necessitating repeated, frequent blocks, resisted by the patient. Better success was had with the anesthetic oil solutions, but the disadvantages of the oil solvent are well known.[14–16] Its failure to inhibit anesthetic duration and its propensity to cause nerve degeneration greatly limits its use.

The pharmacologic[17] and clinical behavior[17-19] of Efocaine,* indicates that it is of special interest as an agent for intercostal nerve blocks. It is an aqueous solution which produces a local anesthesia of approximately two weeks' duration without local tissue reaction. It does not destroy the nerve[20] and does not interfere with wound healing. The rationale for the prolonged effect is based upon a new concept of parenteral administration. The aqueous insoluble anesthetic bases are dissolved in a non-toxic, water-miscible organic solvent. This solution is at saturation limits so that complete deposition of the microcrystalline active ingredients occurs on injection into the body. The solvent is rapidly absorbed, while the anesthetic repository exerts its effect for the extended period. It was deemed of interest, therefore, to investigate its use as a blocking agent in upper abdominal surgery and study its effects on postoperative pain control and pulmonary complications.

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*Efocaine contains procaine and butyl aminobenzoate in stable solution in a water miscible non-oily vehicle. E. Fougera & Co., Inc., New York.

METHOD

The surgical candidates were private patients, unselected for the most part. The only criteria was the indication for upper abdominal surgery. There was no attempt to choose patients in whom the results might appear more favorable. Rather, the cases were generally consecutive.

Most of the thirty patients were in the older age group since these lesions occur more commonly in the aged. Eighty-six per cent of the patients were over 40, 77 per cent over 50, and 24 per cent over 60. There were 19 women and 11 men in the series. Surgical indications were as follows:

Procedure	Number	Males	Females
Cholecystectomy	18	5	13
Cholecystotomy	1	0	1
Epigastric hernia	5	3	2
Gastrectomy	1	1	0
Mastectomy	2	0	2
Ventral hernia	3	2	1
Total	30	11	19

The surgical anesthesia employed were spinal, epidural, cyclopropane and ether.

TECHNIQUE

Intercostal block was generally carried out at the conclusion of surgery when the patient was under the influence of surgical anesthesia.

The intercostal nerves pass through the intervertebral foramina and run in a groove behind the lower edge of the rib between the internal and external intercostal muscles. They pass below the costal cartilage at the costal arch into the abdominal wall. The nerves run toward the midline in an oblique downward direction, innervating skin and muscles of the anterior abdominal wall excepting the inguinal regions. Bartlett[21] has shown that the intercostal nerves are most accessible in the region from the midscapular to the anterior axillary lines where they run in a closed compartment under and behind the rib.

The technique described by Bartlett was employed.

> The patient is in a recumbent position and the thoracic cage is elevated by means of a small pillow to make the field more accessible. The arm is raised above the head to make the skin taut over the ribs. After preparing the operative site with good aseptic technique, the intercostal block is performed by inserting the needle (22 gauge; 1½ inch) to make contact with the rib. The needle is inserted perpendicularly and when rib contact is made, needle and skin are moved down so that it slides over the rib just past the under surface where the intercostal nerve lies. Aspiration is done to make sure that the needle is not in a blood vessel nor the pleural cavity. The solution is injected and the needle withdrawn. It is desirable to massage the area to distribute the anesthetic solution though this is not essential.
>
> The process is repeated over the next rib until the desired area is anesthetized. Bilateral blocks may be carried out for midline incisions or where an extensive transverse incision is made. Some thought should be given to selection of nerves to be blocked. More commonly these are the sixth to the eleventh intercostal nerves although it may be varied to suit the individual need.

The amount injected was from 1 to 2 cc. The mean anesthetic duration was generally more than ten days when either quantity was used and there appears to be no advantage in injecting either more or less of the solution. Since Efocaine is miscible with the body fluids it is not encapsulated and the solvent phase is rapidly absorbed.

Patients were observed carefully for degree of pain-control, freedom of movement, ability to cough, quantity of postoperative sedative required, and development of pulmonary complications. The anesthetized area was mapped by skin-prick with a sterile needle. In order to minimize subjective influences as much as possible, neither staff nor patients receiving blocks were told of this.

The usual postoperative drug orders were written to be administered when needed. The nursing staff were not given any particular instructions which deviated from routine and no attempt was made to withhold medication.

Patients were watched carefully the first 72 hours after surgery for development of any pulmonary complications. Free motion and early ambulation were encouraged. They were requested to cough several times during the first 24 hours in order to establish the degree of its presence. The usual clinical signs were relied upon as a primary diagnostic means. When there was an unexplained temperature elevation, respiratory rate greater than 28, cough, pain in the chest, or cyanosis, an x-ray film was indicated for confirmation of atelectasis or pneumonia.

RESULTS

Postoperative pain control was achieved to a high degree. Twelve patients had no local pain postoperatively for the entire period of convalescence and required no narcotic or sedative medication. Fourteen had mild pain or were uncomfortable for the first 24 to 30 hours and required 1 to 2 doses of sedative medication. Three received 3 doses of sedative medication and one required 5 doses. This latter patient complained chiefly of "gas pains" although there was no apparent distention. No attempt was made to establish the basis for their need for the drugs. Thus sedatives administered for back pain (two instances), headache (one patient),

TABLE I

EFOCAINE-INTERCOSTAL BLOCK IN UPPER ABDOMINAL SURGERY

No. Case	Age Sex	Surgical Indication	Surgical Anesthesia	Days of Block Anesthesia	Postoperative Medication
1	F 36	Cholecystectomy-appendectomy	Spinal	16	Demerol, 150 mg.
2	F 53	Cholecystectomy	Spinal	12	None
3	F 64	Cholecystectomy	Spinal	18	M.S. ⅙
4	F 58	Cholecystectomy	Epidural	10	None
5	M 61	Epigastric hernia	Epidural	16	Demerol, 300 mg.
6	F 39	Cholecystectomy-appendectomy	Spinal	18	None
7	F 42	Mastectomy*	Cyclopropane	16	M.S. ⅙ x 2
8	M 36	Cholecystectomy	Spinal	20	None
9	M 51	Cholecystectomy	Epidural	10	M.S. ⅙ x 3; Demerol, 300 mg.
10	M 58	Gastrectomy	Ether	14	M.S. ⅙ x 2
11	F 48	Cholecystectomy	Spinal	16	None
12	M 51	Ventral hernia	Spinal	21	M.S. ⅙
13	F 63	Epigastric hernia	Epidural	14	M.S. ⅙ x 2
14	M 55	Cholecystectomy	Spinal	16	None
15	M 64	Epigastric hernia	Epidural	18	Codeine, ½ gr.
16	F 61	Cholecystectomy	Spinal	12	Demerol, 150 mg.
17	F 38	Epigastric hernia	Cyclopropane	11	None
18	M 58	Cholecystectomy	Spinal	12	M.S. ⅙
19	F 47	Cholecystectomy-appendectomy	Epidural	13	M.S. ⅙ x 3
20	F 56	Cholecystotomy	Spinal	14	M.S. ⅙ x 3
21	F 57	Cholecystectomy	Spinal	16	None
22	F 48	Cholecystectomy-appendectomy	Spinal	17	None
23	F 63	Cholecystectomy	Epidural	14	M.S. ⅙
24	M 53	Cholecystectomy	Spinal	12	None
25	F 58	Mastectomy*	Cyclopropane	11	M.S. ⅙ x 3
26	M 53	Epigastric hernia	Spinal	16	M.S. ⅙; Demerol, 150 mg.
27	F 51	Ventral hernia	Ether	12	None
28	M 53	Ventral hernia	Spinal	12	M.S. ⅙
29	F 58	Cholecystectomy	Epidural	14	None
30	F 61	Cholecystectomy	Spinal	16	M.S. ⅙

*Nerve block was carried out on the third to the ninth intercostal nerves.

and restlessness (three instances), were included in the above tabulation.

In contrast to these results we have the postoperative drug requirements of a control group of patients undergoing similar surgery by the same surgeons. These were obtained from hospital archives and every effort was made to keep conditions constant. The control group averaged 5.2 doses of postoperative medication as compared with 1.1 doses for the entire group receiving intercostal blocks.

McCleery and coworkers[22] reported that treated patients in their series required approximately one-half the number of hypodermic injections received by untreated controls although they rarely observed complete skin anesthesia as a result of the block. The results obtained in this series are in excellent agreement with those described by Belinkoff.[23] It must be emphasized that Efocaine produces a local anesthesia of greater period than any of the agents previously reported and perhaps a direct comparison should not be made. However, the trend observed from these studies indicates what can be achieved through efficient intercostal block anesthesia.

There were no pulmonary complications observed in this group, which is in accord with the observations reported by other investigators.[2,7,11,13] Patients were all able to cough and move freely. No case of atelectasis developed in any of the blocked patients.

The mean duration of anesthesia for the test group was 14.2 days with the least duration 8 days and maximum 21 days. There was also a period of hypesthesia for several days. This is significant in evaluating the overall value of the intercostal block in the postoperative management of upper abdominal surgery. Results reported by previous investigators were based upon anesthetics with a duration of from 4 to 8 hours.

No local tissue reactions and no systemic toxicity were evidenced. The drug was rather well tolerated. The agents used and the resultant local anesthesia had no effect on the process of wound repair. Convalescence was uneventful in all instances.

COMMENT

Intercostal block in patients undergoing upper abdominal surgery is valuable in two ways: the greatly decreased incidence of pulmonary complications and reduction of patient morbidity.

The pulmonary complications endangering life and contributing to prolonged morbidity are atelectasis and pneumonia. The lobular atelectasis that is frequently encountered is alleviated or goes on to bronchopneumonia. Any procedure which will prevent or limit the disposition to these complications is of more than theoretical significance. Cutler and Hoerr[24] reported an 11 per cent incidence of pulmonary complication in biliary tract procedures and 23 per cent in gastric surgery. Mimpriss[25] found that 29 per cent of patients in a series of 100 gastrectomies evidenced varying degrees of lobular and lobar atelectasis while Blodgett and Beattie[26] reported an 11 per cent incidence of pulmonary complications in first day risers and a 13 per cent in nonearly risers following upper abdominal surgery. It is noteworthy that most of these complications occurred following gastric surgery rather than other upper abdominal procedures. Still other factors enter into the overall picture, of course, such as advanced age and its consequent physical deterioration.

The primary atelectasis is due to the greatly reduced respiratory excursion resulting from a combination of factors intimately connected with postoperative pain of the surgical site: splinting of the diaphragm, tight abdominal dressings and binders, a reluctance toward deep breathing and coughing and respiratory depression resulting from morphine and opiates. The tendency of the patient to remain in one position is also a factor in the development of venous thrombi. Tight abdominal binders and narcotics are used to depress pain sensations arising from movement of the abdominal muscles and coughing. Similarly, since the abdominal muscles are active in respiration, there is reluctance to take deep breaths because of associated pain. This physiologic basis for atelectasis has been demonstrated by Patey,[9] Kahn,[4] and Starr and Gilman.[7]

When effective intercostal nerve block has been accomplished there is a marked increase in the vital capacity in the first few postoperative days. An approximately 23 per cent greater vital capacity has been observed by different investigators[22] in patients receiving nerve blocks than in the untreated controls. Moreover the blocked series achieved a basic level of vital capacity approximately two days before the control series.[22]

While the technique of administration is relatively simple some comment should be made. Some operators prefer the posterior paravertebral approach since the lateral cutaneous branch of the intercostal nerve diverges in the region of the midaxillary line. Because of the small quantity of solution injected in the midaxillary route, there is the possibility that one branch might escape contact with the drug. The space described by Bartlett does not extend posteriorly and the nerves, which lie beneath the intercostal muscle, are much closer to the pleura than in the midaxillary line. The objection to the posterior route is the possibility of a paralysis of the intercostal muscles, since the motor nerves innervating these muscles arise posteriorly. The additional danger of an intrapleural injection is also present because of the nerves and pleural cavity. Both of these complications are minimized when the midaxillary technique is used. The possibility of an incomplete block is a small price to pay for the safety afforded.

The effect on patient morbidity is quite dramatic. The patients are more comfortable, happier and require less nursing care. Early ambulation is encouraged. There is a strong psychologic stimulus in that, in most instances, the patient is able to walk to the toilet facilities, with assistance, even on the first day.

Important too, is the fact that private nursing care is not required by most of the blocked patients. This is not a question of "doing without" nursing care but rather of needing less care because of the freedom of movement present, due to effective pain control. A tabulation of calls or nursing demands made by a series of ten blocked patients was compared with ten untreated controls. The blocked patients averaged 5.3 calls in 48 hours as compared to the control demands of 16.5 calls. This was in spite of the fact that the treated group received one-tenth the amount of narcotic medication and were awake a greater proportion of the time during the first 48 hours.

While this report is primarily concerned with the effects of the intercostal block in upper abdominal surgery, there is also a broad application of this procedure to thoracic surgery and general practice. The intercostal nerve block may be advantageously used for pain control after thoracotomies, thoracoplasties, empyema, pleurisy, chest-trauma and rib fractures. The block is safe and may be easily carried out in the office as well as the operating room. With reasonable care, it presents no hazards and causes the patient no discomfort. When carrying out nerve blocks in the office, a skin-wheal is raised over the desired ribs and the surrounding tissue infiltrated with procaine hydrochloride solution.

It is important to delineate the painful area when the intercostal block is used for pain control. Generally the nerves both immediately above and below the area are included. It is emphasized that these blocks are used to supplement therapy and not to replace it. The usual diagnostic procedures should be employed to determine the basis for the pain. However, with intercostal block this becomes easier since patient cooperation is greater in the absence of pain. The procedure has now been carried out in more than 50 blocks for miscellaneous chest pain in the office. These blocks were all successful and there was relatively no discomfort during the procedure.

We have found Efocaine to be safe and effective, producing an anesthesia for prolonged periods of time. This local anesthetized area is a cause of little concern and presents no problem from the viewpoints of either physician or patient. There was no interference with wound healing as well as no local tissue reactions. The anesthetized area gradually diminished in size and normal sensitivity returned in all instances. Clinically and particularly from the viewpoint of the patient this technique is worthy of further application.

SUMMARY AND CONCLUSIONS

1. Atelectasis and pneumonia are common postoperative complications of upper abdominal surgery which have been described as resulting from the decreased respiratory excursion due to postoperative pain.

2. The application of intercostal nerve block with Efocaine for the control of postoperative pain is described.

3. The intercostal block afforded the patients a high degree of pain relief permitting freedom of movement, deeper breathing and coughing. It also decreased the patients' morbidity.

4. The blocked patients received an average of 0.7 doses of postoperative medication as compared to 5.2 doses required by the control group. Local anesthesia was present for a mean duration of 14.2 days with a least duration of 8 days and a maximum of 21 days.

5. There were no local or systemic toxic manifestations and the drug was rather well tolerated in all instances. There was no interference with the process of wound repair and no aleration of the skin.

6. Local anesthesia with Efocaine may be advantageously used for intercostal nerve block as a means of postoperative pain control in upper abdominal surgery. The successful application of this technique is an effective means of preventing postoperative pulmonary complications.

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(References continued on page 225)

This is the sixth in a series of letters to Dr. J. A. Myers and the readers of the Journal-Lancet *from Dr. Ancel Keys, director of the laboratory of physiological hygiene at the University of Minnesota, during a year of study and travel abroad. Other letters will follow in subsequent issues.*

Notes from a Medical Journey

26 February 1952, Naples, Italy

Dear Jay:

Naples is a far cry from Minneapolis - or Oxford, for that matter. Like much of Italy, the steep mountains come tumbling down to the sea, with the slopes covered either with tightly packed buildings or elaborately terraced to use every foot for cultivation of olives, grapes, lemons and oranges, with vegetables planted between and under the trees. In the towns the sea edge is fringed with palms and the blue (really blue) Mediterranean makes a lovely foil for the pink, yellow, and white houses. The narrow streets teem with people through which automobiles miraculously find a way only to be blocked by wagons, donkeys, and pushcarts. The autos honk, the donkeys bray, people shout and sing and all is good-humored confusion.

I wish we could sit in the sun or go strolling along the water front, but mostly we are hard at work - we start before nine in the mornings and we rarely stop before seven-thirty in the evening. In the laboratory we find it chilly at this time of the year; the marble walls and tiled floors make it feel colder than the 55 to 59 degrees, Fahrenheit, which is the indoor temperature range we have recorded in our two weeks here. We shall probably collapse from the heat when we return to the hot-house atmosphere of the University of Minnesota.

The work here goes very well. So far we have studied sixty men between the ages of 25 and 55 and by the time we leave next week we hope to have extended the age range and to have completed the work on about 95 men in all. Half of the men are firemen and the others are "vigili anonari" – municipal employees who act as auxiliary policemen, watchmen, and the like. All of these men are ill paid and subsist on a very simple diet, mostly bread, spaghetti and vegetables. Fats, almost wholly vegetable in origin, provide some 20 per cent of the total calories in contrast with the 30 to 40 per cent in Minnesota and England. Meat or fish gets on the table once or twice a week and only the well-to-do have butter or cream. The average weekly intake of our men includes about a pint of milk, one egg, and two or three ounces of skim-milk cheese. All of this makes a diet below the low-fat, low-cholesterol diets now popularly prescribed at home. What generations of such subsistence does to the serum cholesterol level is our immediate problem and soon we hope to have a pretty fair answer.

We are getting splendid cooperation. Doctors Flaminio Fidanza and Vincenzo Scardi, of the Biochemical Institute, are at work with us day and night and several other young doctors fetch and carry and help wash the glassware - of which we use astonishing amounts in the blood analyses. The subjects come to the laboratory after they have had a general clinical examination in the Naples Department of Health. Here we make the anthropometric measurements, draw blood, check the diet histories and give a "once-over-lightly" check-up, including six leads of the electrocardiogram. The men are good-natured and anxious to oblige, including trying to understand my rudimentary Italian which I constantly mix up with Spanish.

The University of Naples is rather like the University of Minnesota in that it is the academic center for a large area and has close to 25,000 students. The Medical School is the largest single faculty and has over 2,000 students enrolled. Fees are low and the general idea is that anybody who is not impossibly stupid and insists on enrolling manages to get in. Perhaps the worst feature is the custom of allowing students to repeat examinations year after year until, eventually, even the poor students slip through. Of course, all this is bad for the good students and one result is that there is a large number of medical graduates who do not practice medicine because they cannot make a living at a profession for which they have neither talent nor abiding interest.

Shortly after arrival here I came down with a severe, but short-lived, case of influenza and Margaret followed in my unhappy footsteps a few days later. One recompense for the aches and malaise was the opportunity afforded to get acquainted with Dr. Marotta, Professor of Clinical Medicine, who was most kind and attentive and seems to be an excellent physician. He, like all his colleagues in the Medical School, has a big practice and works very hard to keep abreast of the needs of both students and patients. In spite of the low salaries, competition for the professorships is very keen here, partly because of the prestige and the usual academic values, partly because the professors are at the top of the consulting ladder and command commensurate fees. The junior academic people are still more overworked and grossly underpaid. An assistant professor on the full-time staff gets less than 100 dollars a month - and life in Naples is not cheap. In the markets and in the restaurants food here runs about two-thirds as much as at home, with the exceptions of bread, vegetables and wine which are less than half what they are at home. Clothes and all manufactured goods are just as costly as with us and some things - cigarettes and gasoline - cost twice what they do in the States. So life is not easy except for the rich who worry, as at home, about keeping up with each other and making over last year's mink coats for the new season.

All thoughtful people here are agreed that Italy is too poor in natural resources to support a population now crowding on fifty millions, but what is to be done? There is very little more that can be done to increase the agricultural production and there are no minerals or natural fuels to be developed. Much has been done to develop hydroelectric power and now practically all the railroads are electrified and use no coal or oil. These were the reasons why, in the days of Mussolini, the population eagerly turned to the dream of a great African empire. Anyway, the scenery is grand and the people are as gay and friendly as may be ; poverty never seems as bad in a climate and an atmosphere like this as it would be in the grimmer north.

Letters from home tell us that Doctors Taylor, Brozek, Simonson and Joseph Anderson are doing a good job of running the program under the Stadium, that Gaylord Anderson is busy running the American Public Health Association, and that Dean Diehl has hopes the Mayo Memorial will be built some day. Our small Martha blooms in California and the other children are having a fine time in Oxford. If it were not for the imminent deadline for income tax we should be very content.

With all the best to you and our friends at home,

As ever,

Ancel Keys

Meet Our Contributors . . .

Howard A. Anderson was graduated from the University of Minnesota medical school in 1947, after which he held a fellowship in internal medicine at the Mayo Foundation. He is now associated with the division of medicine at Mayo Clinic in Rochester.

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Robert J. Anderson is a graduate of the University of Minnesota medical school, holds an M.S. in public health from Columbia University, and has been a commissioned officer of the U. S. Public Health Service since 1940. He is medical director and chief of the division of chronic diseases and tuberculosis of the Public Health Service.

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Robert M. Fawcett was graduated from the University of Pennsylvania medical school in 1940, practices internal medicine at Devil's Lake, North Dakota.

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Sydney Jacobs was graduated from Tulane University school of medicine in 1930, where he is now assistant clinical professor of medicine.

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Michael F. Koszalka was graduated from Georgetown University school of medicine in 1938, is an internist and chief of the medical service at the V. A. hospital, Fargo, North Dakota.

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Julius B. Novak was graduated from the University of Illinois college of medicine in 1926, now specializes in chest diseases. He is associate professor of medicine at Chicago medical school, medical director of the Tuberculosis Institute of Chicago and Cook County, and attending physician at University hospital.

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Forrest W. Pitts was graduated from the medical college of Virginia in 1947, specializes in internal medicine and chest diseases at Fitzsimmons Army hospital, Denver, where he is associated with the tuberculosis division of the medical service.

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★

Harry A. Wilmer was graduated from the University of Minnesota medical school in 1941, did graduate work at Johns Hopkins university and the Mayo Foundation, now specializes in psychiatry in California. He is instructor in neuropsychiatry at Stanford university, and is on the staffs of Palo Alto, Sequoia, San Mateo Community and Stanford hospitals.

Lancet
CLINICAL
REVIEWS

This new department of The Journal-Lancet *is devoted to reports on cases in which all appropriate diagnostic criteria have been employed, the best known treatment administered and the results recorded. It is desired that these case reports be so prepared that they may be read with profit by physicians in general practice, hospital residents and interns and may be of considerable value to junior and senior students of medicine. This department welcomes such reports from individuals or groups of physicians who have suitable cases which they desire to present.*

Histoplasmosis*

HOWARD A. ANDERSEN, M.D.†
Rochester, Minnesota

A carpenter, aged 54, was first seen at the Mayo Clinic on March 8, 1951. His chief complaint was pain in the right side of the thorax which had been present for about five weeks. On the day of the onset of the pain, he had worked in a closed room in which a defective kerosene stove had emitted excessive fumes. In the evening, he had noted the gradual onset of pleuritic type pain in the right side of the thorax. Although the thorax had been strapped with adhesive tape, the pain had persisted. Ten days later, roentgenographic examination had disclosed a lesion in the right cardiophrenic angle and infiltration in the lower part of the left pulmonary field. Penicillin had been administered for eight days, but it had not produced any symptomatic improvement. Subsequent roentgenographic examination of the thorax disclosed the same findings that had been observed previously. Two weeks before the patient came to the clinic, a slight cough had developed and the severity of the thoracic pain had begun to decrease gradually. The cough had produced a very small amount of mucoid sputum. There was no history of hemoptysis. Anorexia and mild constipation had occurred in the course of the illness, and the patient had lost about 10 pounds (4.5 kg.). In 1947, shortly after the patient had returned from a trip to Mexico, he had had a similar attack of thoracic pain which had lasted about two weeks.

When the patient was examined at the clinic, pulmonary expansion was found to be limited on the right side, and inspiration was stopped suddenly by pain. Percussion disclosed dullness at the base of the right lung, and the intensity of the breath sounds was found to be decreased over the area of dullness. Forward bending produced pain in the right flank. Proctoscopic examination disclosed internal and external hemorrhoids.

The urine was normal. The erythrocytes and leukocytes were 4,480,000 and 6,400 per cubic millimeter of blood respectively, and the differential leukocyte count was normal. The value for the hemoglobin was 12.7 gm. per 100 cc. of blood, and the sedimentation rate of the erythrocytes was 9 mm. in one hour. The results of a Kline flocculation test for syphilis were negative.

Roentgenographic examination of the colon did not reveal any abnormality. Routine roentgenographic examination of the thorax disclosed the following changes: enlargement of the hilus of the right lung, fibrosis of the lower lobe of the right lung, pleural thickening or pleural effusion at the base of the right lung, some decrease in the volume of the lower lobe of the right lung, and linear fibrosis in the lower lobe of the left lung (figure 1). The roentgenologist expressed the opinion that the decrease in the volume of the lower lobe of the right lung might be due to obstructive pneumonitis. A subsequent roentgenogram which was made by placing the patient in the right lateral decubitus position disclosed the presence of free fluid in the pleural cavity on the right side.

Thoracentesis produced 350 cc. of thin, bloody fluid which had a specific gravity of 1.020. Microscopic examination of the fluid did not disclose any malignant cells or acid-fast bacilli. Bronchoscopic examination did not reveal any abnormality, and cytologic examination of aspirated bronchial secretions did not disclose any malignant cells. Microscopic examination of several

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*The first of a proposed series of case presentations on problems in the field of thoracic diseases.

†Division of Medicine, Mayo Clinic, Rochester, Minnesota.

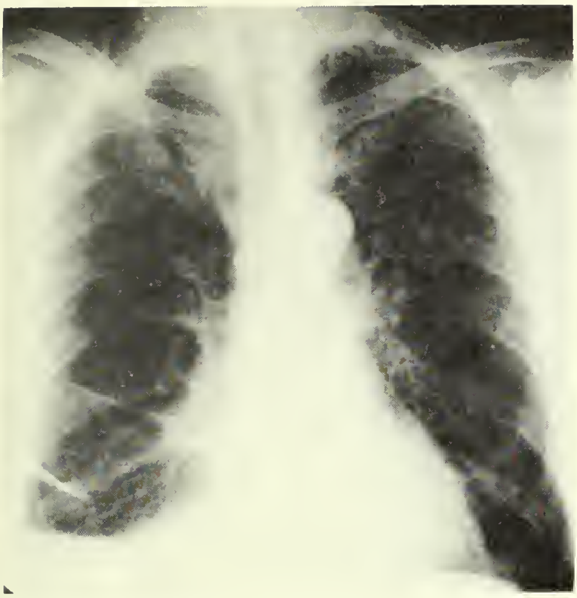

Fig. 1. Roentgenogram of thorax made at time of initial examination on March 9, 1951. This shows enlarged hilar shadow on the right, some "fibrosis" in both lower lobes, and pleural thickening or pleural effusion at the base of the right lung.

specimens of sputum also failed to reveal any malignant cells or acid-fast bacilli.

COMMENT

The possible presence of bronchogenic carcinoma should be considered strongly in a case of this type. The history, and the age and sex of the patient were compatible with such a diagnosis. In cases of obstructive pneumonitis due to bronchogenic carcinoma, fever frequently is absent, and the patients often have few symptoms. The presence of blood in the pleural fluid favored this diagnosis. The normal bronchoscopic findings, and the apparent absence of malignant cells in the sputum, bronchial secretions and pleural fluid made the presence of a bronchogenic carcinoma seem unlikely, but they certainly did not make such a diagnosis untenable.

Pulmonary infarction due to an embolus sometimes produces the clinical picture observed in this case. Although blood frequently is found in the pleural fluid in cases of pulmonary infarction, it was felt that the long duration of a pleuritic type of pain in this case would be unusual in a case of pulmonary infarction. Although the roentgenograms which had been made before the patient came to the clinic were not available for examination, they were said to have revealed a lesion in the left side of the thorax. Roentgenographic examination at the clinic disclosed linear fibrosis of the lower lobe of the left lung. The roentgenographic findings and the history of pain on the right side of the thorax were more suggestive of pulmonary infarction than they were of bronchogenic carcinoma.

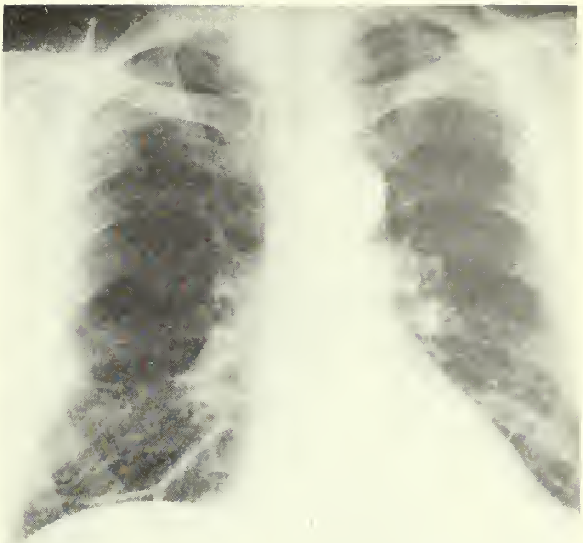

Fig. 2. Roentgenogram of thorax made on June 5, 1951, showing considerable improvement.

Although aspiration pneumonitis is frequently bilateral and may simulate any inflammatory or neoplastic lesion of the lungs, there was no history of dysphagia or regurgitation, recent operation, ingestion of mineral oil, or use of oily nose drops. Roentgenologic examination of the esophagus was suggested, but this was not done.

The possible presence of tuberculosis or mycotic infection was considered, but it was thought that the clinical picture was not characteristic of either of these pathologic conditions.

An exploratory operation was not performed. If a bronchogenic carcinoma were present in this case, the presence of blood in the pleural fluid would suggest that the lesion was inoperable.

FINAL DIAGNOSIS AND SUBSEQUENT COURSE

Culture of the pleural fluid revealed Histoplasma capsulatum. It, therefore, was assumed that the pulmonary lesion was histoplasmosis. A regimen of rest in bed was recommended. A cutaneous test for histoplasmosis was performed subsequently, and the result of the test was positive. In the past, this test has not been uniformly helpful in the diagnosis of this disease. On June 5, 1951, roentgenographic examination revealed definite improvement in the pulmonary lesion (figure 2). There was no evidence of pleural effusion at that time. On August 12, 1951, the patient reported that he was feeling well.

Rheumatic Pneumonitis Treated With Cortisone*

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The occurrence of allergic or inflammatory pulmonary lesions during the course of rheumatic fever is known as rheumatic pneumonitis, pneumonia, pneumonopathy or rheumatic lung.[1] Two different clinical types are recognized, both accompanied frequently by pericarditis and pleuritis. The first group presents slight toxicity, some fever, a slight cough usually productive of a blood-streaked, nonpurulent sputum without respiratory distress but striking physical findings of fleeting pneumonitis migrating from one lung or part of one lung to another. The other is characterized by marked toxicity, higher fever, cough with production of scanty blood-tinged sputum, severe dyspnea and cyanosis, all out of proportion to the physical findings. Both groups are morphologically identical at autopsy, however. The latter usually terminates fatally while the former seldom alters the prognosis in the course of rheumatic fever. In their series, Seldin et al[2] reported the incidence of rheumatic pneumonitis or pneumonia in rheumatic fever as 5 per cent with a mortality rate of 100 per cent.

In May 1949 Hench et al[3] reported dramatic disappearance of fever, tachycardia, polyarthritis, elevated sedimentation rate and abnormal electrocardiographic changes in three patients with acute rheumatic fever treated with cortisone and one with ACTH. In the same year Thorn et al[4] reported a similar beneficial effect of pituitary ACTH therapy in rheumatic fever. Subsequently further experiences with these hormones were reported by the Mayo group[5] and others. It is beyond the scope of this paper to review the literature on this subject. Except for inference to the seriousness of pneumonopathy occurring in rheumatic fever, the literature has no specific record of its response to cortisone or ACTH.

Hence, the object of this presentation is to report a critically ill patient in group 2 with rheumatic fever, polyarthritis, pericarditis, pleuritis and pneumonitis in whom cortisone therapy was a life-saving measure.

History: V. S., a 38-year-old white male, was admitted to the hospital on June 1, 1951. He had had rheumatic fever in 1934. On May 16, two weeks before admission, he developed generalized aching and stiffness, weakness, and some fever. A few days later he was admitted at a local hospital where salicylates were administered without effect. Subsequently, fever increased, sweats, chest pain and severe dyspnea with cough appeared, resulting in transfer to this hospital.

Physical Examination: The patient appeared acutely ill. Temperature was 101° F., pulse rate 120 and respiratory rate 34 per minute. Blood pressure was 134 systolic and 65 diastolic mm. of Hg. His face was plethoric and skin drenched with sweat. Marked dyspnea and slight cyanosis was present. Respirations were shallow and grunting in character. There was a slight respiratory lag of the left chest. On auscultation bronchial breath sounds were heard and the percussion note was impaired over the left lower chest. The heart was not enlarged. In the presence of tachycardia there was a faint suggestion of a to-and-fro murmur without a friction rub over the pericardium. The abdomen was moderately distended and tympanitic. The right knee was slightly enlarged and there was some stiffness in the hips.

A diagnosis of rheumatic fever, pneumonia and possibly bacterial endocarditis was made. Sodium salicylate, 15 grains q.i.d. and crystalline penicillin G 100,000 units every three hours with codeine for control of pain was prescribed. The red blood cell count was 4,500,000 per cu. mm. and the hemoglobin 13 g. (Sahli). The white blood cell count was 13,500 cu. mm. with 76 per cent polymorphonuclear cells. The sedimentation rate was 18 mm. in one hour (Wintrobe). Type VII pneumococcus was found in the sputum but no pneumococci were isolated from the sputum on culture four days later. An electrocardiographic tracing was within normal limits. A roentgenogram of the chest showed the heart to be within the upper limits of normal and a patch of pneumonitis in the left base. Serology was negative. There was an initial 1 to 2-plus albuminuria but all subsequent urinalyses were negative.

Fever, respiratory distress and chest pain increased so that an oxygen tent was required. On June 5, aureomycin 500 mgm. q.i.d. was begun and the penicillin increased to 300,000 units every three hours. In the meantime, the white blood cell count rose to 17,100 with 88 per cent polymorphonuclear cells and the sedimentation rate to 38 mm. in one hour. He began to show signs of delirium. There was an increase in cyanosis and his cough, productive of thick white sputum occasionally blood-tinged, continued. Sweating was profuse. Penicillin was increased to 400,000 units every three hours on June 9. The initial and five subsequent blood cultures with penicillinase were negative. At times the patient appeared in extremis.

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A pericardial friction rub was detected on June 12 along with tender, painful, swollen wrists. The electrocardiographic tracing showed typical elevation of the S-T segment in standard leads I and II and V leads 2, 3 and 4. The salicylates were then increased to 20 grains q.i.d. with slight subjective improvement. The respiratory distress, fever, and tachycardia continued without abatement. Penicillin therapy was discontinued on June 14. Although the chest x-ray showed resolution of the lesion in the left lower lobe, a pleural friction rub persisted, and increasing infiltration of the right lower lobe was noted by June 21. The following day the pericardial friction rub was no longer detectable and the electrocardiogram had returned to normal. At this time mild anemia was present. The red blood cell count was 3,530,000 per cu. mm. and hemoglobin 11 g. Sedimentation rate remained elevated at 36 mm.

Cortisone 100 mg. daily was started June 29 at which time a chest x-ray film demonstrated consolidation of approximately one-half of the right lower lobe and the joints of the wrists and hands were swollen, tender and painful. Both shoulders were also painful on motion. Within four days the fever, leukocytosis, tachycardia, respiratory distress, joint pain and swelling subsided although the roentgenograph persistently revealed pneumonitis with an element of atelectasis of the right lower lobe until July 24. Cortisone was decreased 25 mg. daily and salicylates discontinued. However, a flare-up of arthritis July 16 necessitated reinstitution of salicylate therapy with relief. Graduated activity out of bed was started. On July 30 when resolution of right lower lobe pneumonitis had cleared almost completely radiographically cortisone was reduced to 50 mg. by mouth and all medication was discontinued August 9. During the early part of August a pleural friction rub over the right lower chest was noted for a few days. The sedimentation rate gradually fell during this time to 21 mm. per hour and remained moderately elevated. The red cell count rose to 4,520,000 and the hemoglobin to 13.2 g. By August 24 the patient had become completely asymptomatic and showed a weight gain of 10 pounds.

After a month of convalescence at home he returned on September 25 for a medical checkup. He stated that he felt quite well except for an attack of right pleuritic pain during his first few days at home. Easy fatigability and some joint stiffness was also noted. On examination the temperature and pulse were normal. There was no cardiac murmur and the lungs were clear. All the joints appeared normal. Blood studies revealed a hemoglobin of 14.5 g. and a red blood cell count of 4,960,000. The white blood cell count and urinalysis were normal. The sedimentation rate was 18 mm. The electrocardiographic tracing was normal and the chest roentgenogram negative except for slight residual pleural thickening in the right costophrenic angle.

COMMENT

The clinical criteria proposed by Jones[6] were used to establish the diagnosis of rheumatic fever. Pathologically the pulmonary lesions seen in rheumatic fever are also observed in other conditions such as periarteritis nodosa, subacute bacterial endocarditis, and lupus erythematosus which were excluded clinically. The possibility of an intercurrent pneumococcic pneumonia was ruled out because of the inability to isolate the organisms after smear of initial sputum examination showed type VII pneumococcus; the appearance of serial chest roentgenograms; and the complete lack of response to adequate antibiotic therapy. That the pulmonary changes were primarily due to congestive failure could not be considered in face of an associated pleuritis, the absence of cardiac enlargement and pulmonary signs of decompensation.

Hench,[3] Thorn,[4] and others have demonstrated the value of cortisone and ACTH therapy in rheumatic states. As yet no reported experience includes that of rheumatic pneumonitis treated with cortisone or corticotropin. The patient described had rheumatic fever with polyarthritis, pericarditis, pleuritis and pneumonitis. The mortality rate in this type of case is extremely high. Therapy with salicylates and antibiotics was ineffective, a characteristic of rheumatic pneumonitis. His course appeared grave and critical until cortisone was administered with dramatic recovery.

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Clinicopathological Conference

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PRESENTATION OF CASE

A 61-year-old gas station attendant was admitted to this hospital on May 7, 1951 because of abdominal pain.

He had been in good health until the afternoon of April 18, 1951. On that day while at work he had the sudden onset of severe epigastric cramping pain, which did not radiate, and which caused him to "double up and to gasp for breath." After two hours when the pain did not relent, a physician was summoned. Gastric aspiration produced no relief. The pain slowly receded. The following day he still had dull pain in the epigastrium which lasted for two weeks and was followed by similar intermittent pain.

Following the onset of his illness he developed mild diarrhea with two to three loose stools each day. He became anorexic and lost 20 pounds. There was no melena, jaundice, nausea or vomiting.

The patient drank four glasses of beer each day. His father had died at the age of 72 with carcinoma of the stomach.

Physical examination revealed a well-developed man in no acute distress. There was prominent pulsation of the abdominal aorta and an ill-defined non-tender mass in the epigastrium. The remainder of the examination was negative.

The temperature was 98.6° F., the pulse rate 88 per minute, and the blood pressure 120 mm. Hg systolic and 70 diastolic.

The hemogram showed a hemoglobin of 10.9 gm. per 100 ml., a red blood count of 3.43 million per mm.,^{3} hematocrit of 36 per cent, MCD 7.6 mu, MCV 105 mu^3, MCH 32 micromicrograms, MCC 30 per cent, and a white blood cell count of 13,450 with 79 per cent neutrophils (23 band forms), 18 per cent lymphocytes, 2 per cent monocytes, and 1 per cent eosinophils. An erythrocyte sedimentation rate was 84 mm. in one hour. Routine urinalysis was normal. The blood Kahn was negative.

The blood urea nitrogen was 11.0 mg. per 100 ml., the blood glucose 92 mg. per 100 ml., the serum amylase 142 units, and the total protein 7.0 gm. per 100 ml. with 4.2 gm. albumin and 2.8 gm. globulin. Two stool examinations for occult blood were negative. A gastric analysis showed 18° free HCl and 52° total acidity. The bromsulfalein retention was 5.2 per cent in 45 minutes, the serum bilirubin 0.1 mg. in one minute and 0.4 mg. total, the thymol turbidity 2.0 units, and the cephalin flocculation negative in 48 hours. A random stool specimen showed 54 Ehrlich units of urobilinogen per 100 grams of stool. The urine urobilinogen was .270 mg. in 24 hours.

X-ray films of the chest and abdomen were negative except for a calcified nodule at the base of the right lung. A barium enema and cholecystogram were negative. X-ray films and fluoroscopic examination after a barium meal showed a normal esophagus, duodenal loop, duodenal bulb and small bowel. The stomach was poorly filled. The midportion appeared to be compressed by a large mass which lay anterior to the stomach. The mucosa through this area appeared intact. The radiologist suggested that an intramural mass or an extrinsic mass should be considered. The examination of the stomach was repeated three days later and again showed a marked constriction of the body of the stomach which on this examination was thought to be due to an extrinsic mass. On the second examination there appeared to be an ulcer on the lesser curvature. The mucosa again appeared normal.

Proctoscopic examination was negative. Gastroscopy was unsatisfactory because an obstruction was met in the fundus through which the gastroscope could not be advanced.

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The patient continued to complain of vague intermittent epigastric distress. His temperature rose to 99.6 to 100° F. orally daily.

On May 24 an operation was performed.

DISCUSSION

DR. R. S. YLVISAKER*: May we first see the x-ray films.

DR. STERNS: There is displacement of the stomach by an extragastric mass (figure 1). I do not believe there is an ulcer present. There is normal mucosa traversing the whole constricted area.

DR. YLVISAKER: One of the difficulties in this case is that the patient was not admitted in the acute stage. I have to rely on the history for the onset. The character of the onset is very important. It began with a severe epigastric pain which came on suddenly and it was cramping in nature. The pain doesn't radiate. That is important. The pain did not go through to the back, did not radiate upward into the chest and shoulders; it remained localized in the epigastrium. Another point is that the pain caused the patient to double up and to gasp for breath. That reaction occurs following a ruptured viscus in the upper abdomen. That is the position the patient likes to assume. You will see them in bed with their legs doubled up, holding themselves quite rigid. They will also complain of not being able to get their breath. Their diaphragm is splinted, as well as their abdominal muscles. Those points in the history are quite important.

Starting on that basis I shall list some diagnostic possibilities and then enlarge on those. Because of the sudden catastrophe involving the upper abdomen, I will list a ruptured peptic ulcer as the number one diagnosis. A duodenal or gastric ulcer must be considered. At the age of 61, with a family history of carcinoma, ruptured carcinoma of the stomach is a possibility. Acute pancreatitis certainly has to be considered. These, of course, would be in the subacute stage at the time of admission, but at the time of onset would be acute. At this age mesenteric thrombosis is a possibility. Now with the x-ray there are other things to include although as a rule they do not produce an acute sudden process such as this. I am thinking of epigastric tumors of various kinds, either extragastric or intramural tumors in the stomach. These are included because some of them as they grow to a certain size come to the point where they will cut off the circulation and will produce sudden pain.

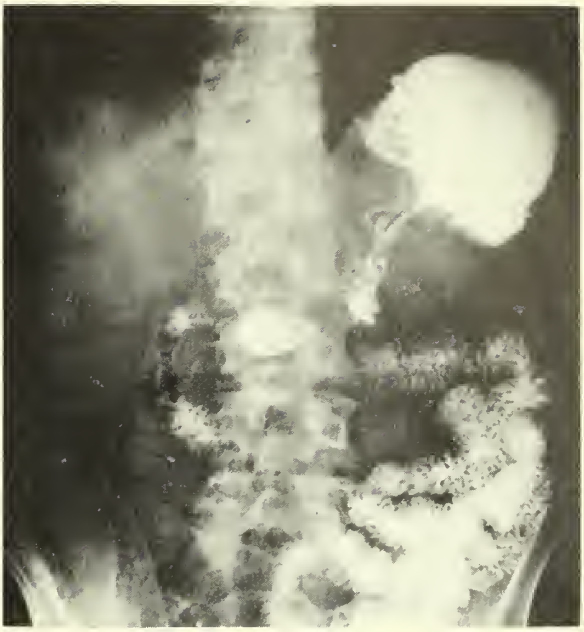

Fig. 1. X-ray film showing displacement of stomach by epigastric mass.

Now let us go back over these. On the history alone ruptured peptic ulcer would be in the forefront. Against this is his age. According to the literature ruptured peptic ulcer is not common after the age of 50. That is not an absolute rule. It is stated as not being common and most of us have had the same experience. Is it a duodenal or gastric ulcer? The usual ratio in a younger person is four to one but might be reversed somewhat at this age.

In favor of carcinoma of the stomach is the family history of cancer of the stomach, which is certainly something to be reckoned with. His age is well within the cancer range. I ran across one article stating that by 1935 only 67 cases of a ruptured gastric carcinoma had been reported. That is not very common. That probably doesn't include, however, such things as perforation into the pancreas posteriorly, which is not uncommon.

This could very well be acute pancreatitis. However, there are certain features of the present story which would not fit in. The most important is that there was no radiation of pain to the back. The appearance of a mass in the x-rays is anterior rather than posterior which would be against a diagnosis of acute pancreatitis with a mass developing from that. This is too late in the game to expect the serum amylase to be elevated.

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Mesenteric thrombosis produces acute abdominal pain. The pain is usually not localized in the epigastrium, but is more apt to be a diffuse pain. Also, that should not produce an epigastric mass.

Under the heading of extragastric or intramural tumors are enlarged lymph nodes, Hodgkin's disease in the lymph nodes, sarcoma, and leiomyomata. I do not seriously believe the diagnosis will be one of those, but I include them for completeness.

If I assume he had a ruptured viscus, I would then have to presume that he recovered from an acute attack in a few hours and developed a walled-off abscess. That would be about the only way to account for this picture including a mass which is producing pressure on the stomach. This can happen, of course. He could have a gastric or duodenal ulcer which ruptured anteriorly and became walled off well up towards the left lobe of the liver.

If I am really hunting around, especially as I have to hunt around out here, I have to include some pathology of the liver as well, such as a mass in the liver which is producing pressure on the anterior wall of the stomach. This would have to be in the nature of something that could produce an acute onset.

There is one thing that is particularly bothersome in this case, and that is at the same time as the onset of pain he developed diarrhea. That could be simply an irritative process from the localized peritonitis; but at the onset constipation would be more likely. If I am going to consider seriously the diarrhea, I will have to mention such diseases as amebic dysentery with the possibility of a liver abscess which at the onset of this acute illness may have ruptured and sealed off again.

Since I have to make up my mind as to the probability of the diagnosis here, I shall enter peptic ulcer as number 1; number 2, ruptured gastric cancer; 3, liver abscess, probably amebic with involvement of anterior gastric ulcer; and 4, extragastric or mural tumor.

I should have mentioned in the original discussion the possibility of cholecystitis with rupture. That is ruled out by the normal cholecystogram. The fact that proctoscopic examination is normal argues against amebic dysentery but does not completely rule it out.

DR. BELL: Are you influenced at all by the roentgenologist's report that there is no ulcer?

DR. YLVISAKER: Of course, I was influenced in my original thinking by the statement in the protocol that there was an ulcer.

DR. HAMMARSTEN: The examination was performed three weeks after the acute illness and I presume a gastric ulcer could disappear in that time.

DR. HELLER: I should like to ask if you are concerned at all with the anemia, the elevated sedimentation rate, and the weight loss.

DR. YLVISAKER: That would argue in favor of malignancy. But he did have free hydrochloric acid present. With a walled-off abscess you may get an elevated sedimentation rate and an anemia.

A RESIDENT: What do you think produced the obstruction at the fundus that was encountered during the gastroscopy?

DR. YLVISAKER: A mass pushing anteriorly on the stomach can obstruct the passage of the gastroscope very easily. I have seen that numerous times.

DR. BELL: Could that constriction of the stomach be caused by spasm?

DR. YLVISAKER: That would argue again in favor of a walled-off abscess.

DR. EVANS: Where would that ulcer have had to be to produce a mass in this position?

DR. YLVISAKER: The ulcer could be in almost any position in the stomach and produce an inflammatory mass in this position.

DR. HAMMARSTEN: The students today all voted with Dr. Ylvisaker with the exception of one who thought the lesion was malignant. The clinical diagnosis was the same as Dr. Ylvisaker's.

DIAGNOSES

Clinical diagnosis: Ruptured peptic ulcer with walled-off abscess.

Dr. Ylvisaker's diagnosis: Ruptured peptic ulcer with walled-off abscess.

Anatomical diagnosis: Perigastric abscesses.

PATHOLOGICAL DISCUSSION

DR. GLEASON: I enjoyed Dr. Ylvisaker's discussion very much and I think he arrived at the best possible diagnosis, but he didn't quite describe what we found. He has my sympathy because from the specimen we received we are still a little mystified.

At operation the greater omentum was gathered up and adherent to the stomach wall and to the liver. The surgeons also found a mass located behind the stomach and adherent to the pancreas and to the posterior wall of the stomach. In dissecting into this mass they encountered a sort of ragged cavity behind the stomach and in front of the pancreas, which did not communicate with the stomach but was setting there behind the stomach and in front of the pancreas. The operation performed was a gastrectomy under the impression that the man probably had a perforated gastric ulcer. Dr. Wood was at the operation and wrote the operative note. Was anything noticed in the way of any lesion in the pancreas?

DR. WOOD: A mass was adherent to the pancreas, and also adherent to the transverse mesocolon.

DR. GLEASON: The resected specimen showed localized hypertrophic gastric folds and we thought he had a hypertrophic gastritis. There is no actual ulcer in the specimen. There are abscesses behind the hypertrophic rugae. The posterior wall of the stomach is ragged and pliable with inflammatory material on the surface of it. Microscopic sections showed an inflammatory process extending into the wall of the stomach but stopping short at the submucosa. It appears to come from the outside.

DR. HELLER: Where do you think inflammation came from, Dr. Bell?

DR. BELL: I think it was hematogenous. I do not think it came from an ulcer since there isn't any ulcer there. These are very peculiar perigastric abscesses.

DR. HAMMARSTEN: What do you think the acute episode was, Dr. Bell?

DR. BELL: I suppose a flare-up of his abscess. Some of this constriction of the stomach was spasm. If he had a perforated ulcer we should have found some evidence of that.

DR. HELLER: Schindler describes cases following gastroscopy where air has gone through the stomach and at operation there was no evidence of perforation.

DR. YLVISAKER: I had a similar experience myself where I perforated the stomach with a gastroscope and I produced a massive pneumoperitoneum.[1] The surgeon who examined that stomach two to three hours after perforation could not find the perforation. He pumped the stomach up with air and also filled it with methylene blue and was unable to demonstrate a perforation.

DR. HELLER: Have you ever seen a case like the one we are discussing today, Dr. Bell?

DR. BELL: No, I haven't.

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Surgical Explorations in Silent Lung Disease

Pulmonary lesions are discovered more easily during the early silent form than disease in any other internal organ. Radiologic screening is bringing an increasing number of potentially serious lesions under observation at an early stage of development. Thus the physician is forced to make critical decisions regarding the management of patients when diagnosis is difficult.

X-ray diagnosis is uncertain, even by experienced workers, because of many factors. The roentgenogram is a valuable tool for locating areas of increased density, but reveals shadows only. It is sometimes a problem to specify the actual lesion which has caused the shadow.

The patient with abnormal roentgen shadows and few or no symptoms taxes the physician's ingenuity, although these shadows may be the only positive clue to serious organic disease, possibly to cancer. Secretions for bacteriologic or histologic examination may not be available. Bronchoscopic examination may be unrevealing and aspiration of suspicious areas produces no additional evidence. Regardless of how low or high the cancer potential may be, the physician cannot risk the possibility of disregarding carcinoma in any case. Untreated cancer of the lung is always fatal. Proper timing in the treatment of lung cancer has more to do with success than any other factor.

The abnormal shadows must be labeled promptly, particularly in men over 35 years of age. Delays to allow guinea pig inoculations or cultures to eliminate the diagnosis of tuberculosis are not justified, affirms Richard H. Overholt, M.D. Intervals of time for comparison of chest films and postponement for repeated bronchoscopic examinations are unwarranted.

If there is reasonable doubt as to the identity of an abnormal roentgenographic density, the surgeon must conduct a safe exploration, obtaining adequate tissue representative of the lesion for the pathologist and conserving all healthy pulmonary tissue possible.

The following alternatives, short of removing an entire lung or lobe, may be used in obtaining tissue for histologic study: (1) Surface biopsy may be possible if the growth extends to the periphery at any point. (2) If the lesion is small and near the surface, a wedge resection may be done. (3) After identification of vascular, bronchial, and glandular structures, a direct biopsy of a centrally placed tumor may be tried. (4) Suspiciously enlarged lymph glands may be removed. Cancer is not disproved, however, if the gland is nonmalignant. (5) Segmental resection may be carried out, since many early tumors are well localized to one pulmonary segment.

Richard H. Overholt: The value of exploration in silent lung disease. Dis. of Chest 20:111-125, 1951.

LESS THAN HALF WAY

The rapidly declining tuberculosis death rate in this country has engendered a spirit of overoptimism and a sense of false security which seriously threatens attainment of eradication of this disease. The opinion is often voiced that tuberculosis has become such a minor problem that the organized campaign against it has about served its purpose. Some tuberculosis associations and societies have been so deceived by tuberculosis that they are diverting activities to other conditions and diseases to justify continued existence.

UNPRECEDENTED RECORD

It is true that an unprecedented record has been made in the United States in the past 50 years, an achievement superior to that of any major nation. Moreover, there are areas with records far surpassing those of any minor nation of corresponding size.

With a disease that has scourged mankind since prehistoric days on the plains of the Ganges and for which practically nothing had been done in the way of control, it is almost unbelievable that, with organized effort, so much could have been accomplished in 50 years.

The tuberculosis mortality rate decreased from near 200 per 100,000 at the opening of the twentieth century to 22.6 in 1950, and probably less than 20 in 1951. In a sizeable group of states the rate is now 10 or less per 100,000 population.

DECREASING MORTALITY RATE MISLEADING

Mortality rate has never been a good criterion of present or future tuberculosis problems anywhere. This is now especially true, since recently devised methods of treatment are extending the lives of tuberculous persons. There is reason to believe that the mortality rate will continue to decrease for a while, then level off and later increase.

For the most part, deaths from tuberculosis are the result of infections acquired years and even decades before. Since 1940, considerable tuberculous infection has been brought into this country. During and immediately following World War II, more than 15 million persons were sent abroad and some were in contact with contagious cases of tuberculosis. Before the Korean War, the tuberculosis mortality rate in South Korea was 1000 per 100,000.

While many veterans have developed clinical lesions (approximately 1000 per month are being reported to the Veterans Administration), not enough time has passed for the disease to evolve to killing proportions in sufficient number to change significantly the mortality rate in the country as a whole.

Several hundred thousand displaced persons have entered the country from areas where nearly all adults are infected. Although presumably they had no demonstrable clinical tuberculosis on admission, a considerable percentage is certain to have gross lesions evolve; in fact, this is already in evidence. However, it is too soon for enough of them to die to significantly alter the nation's mortality rate.

It has been estimated that three to five million aliens have entered this country illegally and, like displaced persons, they have previously resided where the vast majority probably became infected with tubercle bacilli.

As effective as chemotherapy and excisional surgery are, they do not cure tuberculosis in the strict sense of the word. Although clinical lesions are suppressed and removed, there are still other lesions in such individual's bodies which may later become clinical, and a considerable number of these persons may ultimately die from tuberculosis.

Far too many displaced persons and others have infected associates before their disease was detected, and far too many patients are leaving hospitals and sanatoriums against advice while their disease is contagious.

MORBIDITY INCREASING

Tuberculosis morbidity for the most part is also quite remotely removed in point of time from the original infection. However, morbidity reflects the changing situation a few years earlier than mortality. The reported increase in morbidity over the past decade is in part due to the above groups, and it is reasonable to believe that morbidity will continue to increase for some time. Mass tuberculosis surveys have added considerably to the number of reported cases, but these do not necessarily indicate an increase in morbidity.

WHY ARE WE LESS THAN HALF WAY?

After approximately 50 years of organized effort one may ask why tuberculosis has not been eradicated from the United States. Indeed, why, at the end of 50 years have we traveled less than half the distance to this goal? The very nature of the disease has made it so. For example, the tenaciousness of the tubercle bacillus is such that if it enters a human body at any time, even in infancy, its descendants may remain alive and virulent throughout the remainder of life's span, having at all times the capability of producing destructive and contagious disease.

Since neither a mild nor severe attack of tuberculosis results in dependable immunity, all who had primary infections were in danger of becoming contagious cases—in fact, it was they who contributed all such cases. Moreover, many of those who had clinical disease brought under control reactivated from one to many times and became contagious months and years later, thus complicating the problem. On numerous occasions since 1882 enthusiasm ran high for so-called immunizing agents, consisting of live or dead tubercle bacilli or their products. All failed for lack of premise. Since immunity does not develop naturally and cannot be produced artificially, the tuberculosis problem, unlike that of smallpox or diphtheria, required difficult and prolonged measures. There was no way then or now to prevent people from becoming infected with tubercle bacilli except to protect against contagion. Moreover, there was no way to destroy those already implanted in the bodies of so many people. Until early diagnosis campaigns were under way, most persons with tuberculosis had advanced contagious disease when it was detected. Large numbers died in homes because there were not enough sanatorium beds.

It was necessary a half century ago to institute an educational campaign which required many years and must be continued to the end. Through this campaign, however, legislators were convinced of the need for appropriating funds for the building of sanatoriums. This of necessity was a slow process. As rapidly as possible, a program was evolved for the finding and isolation of persons with contagious disease, with an aim to bringing on generations of persons uninfected with tubercle bacilli.

Among persons born between 1875 and 1910, almost no protection was offered against tubercle bacilli of human or bovine type, and probably the great majority were infected. It was that generation which, for the most part, provided the high mortality rate, filled our institutions to capacity, and afforded the long waiting lists for sanatorium beds over the past few decades. It is still that generation (now elderly people) in which the nation's tuberculosis mortality rate reaches its height. Thus, in the early days of the campaign there was much wreckage to be cleared away. After taking care of the sick and dying, there was practically no time or funds to look after the primary infections by refined measures.

SERIOUS PROBLEM STILL EXISTS

A great deal is currently said about an estimated 400,000 or 500,000 cases of tuberculosis in the United States. Even if this is true, it applies only to those who have active or inactive disease, demonstrable by the x-ray shadows it casts. This is only a small fraction of those who now have tuberculosis but still have clear chest x-ray films, who are destined to develop gross lesions in subsequent years and decades.

The only true criterion of the magnitude of the present and future tuberculosis problems is the number of persons who have and those who subsequently take tubercle bacilli into their bodies. Everyone who has these germs, regardless of present good health and clarity of chest x-ray films, is a potential case of clinical tuberculosis.

Generally speaking, all persons who react characteristically to tuberculin have living tubercle bacilli in their bodies and at least microscopic lesions are present. At this moment no one knows in just what percentage of our population this condition obtains. It is known that through the efforts of the past 50 years the incidence of tuberculosis among children and young adults have decreased phenomenally. In many places it is now rare to find an infant who reacts to tuberculin. In many grade schools no child reacts, and among seniors in high school in the same area, not more than 3 to 8 per cent have been infected. Among persons in later decades of life one would expect a higher incidence of tuberculin reactors, since they passed through childhood and young adulthood with little protection against tubercle bacilli.

On the basis of limited tuberculin testing of adults and extensive testing of children, it has been estimated that tubercle bacilli now reside in approximately 30 per cent of the total population of the United States. In any event, the percentage is high enough to constitute a tremendous tuberculosis problem for many decades.

MOST DIFFICULT WORK LIES AHEAD

One may ask why, with this unexampled accomplishment, there is need for the campaign to continue. The answer is that the battle against tuberculosis is not half won. As difficult as the first half century has been, it was relatively easy compared to what lies ahead. This problem will be solved only when all persons with tubercle bacilli in their bodies are found and watched periodically thereafter, in order that clinical lesions which may evolve will be detected before they have become contagious and when most of them can be treated successfully. We lament that there is no test to detect the presence of cancer while its lesions are still microscopic. For tuberculosis we have just such a test and it must be administered among persons of all ages if our eradication goal is ever attained.

The veterinary profession and its allies have performed spectacularly in controlling tuberculosis among animals even to the level of only 0.14 per cent tuberculin reactors in the nation in 1951 with entire states in which only four animals in 10,000 react and vast areas where no reactor can be found. Nevertheless, they continue testing the cattle herds periodically and plan to do so as long as there is one reactor. Concerning this, A. G. Carlson, D.V.M., Mayo Foundation, says: "An animal that reacts positively to the tuberculin test is properly considered as a dangerous individual . . . in spite of the great advances in control, there is a constant potential hazard as long as only a few infected animals exist." This is no less true among humans, and our problem will not be solved as long as any person reacts characteristically to tuberculin.

The magnitude of our future tuberculosis problem would seem overwhelming were it not for the fact that we possess the knowledge and the armamentarium to solve it. Every worker must face the fact that *eradication of tuberculosis is a long-term project.*

It has been estimated that tuberculosis among humans is now costing this country $350,000,000 annually. This is a paltry amount when one considers what is necessary annually to eradicate it. We can no longer be content with $20,000,000 from tuberculosis Christmas seals and a few million dollars from the Federal government for educational and preventive work. The present and future problem must be set forth and adequate funds requested. America will respond when her citizens are appraised of the magnitude of the problem and a well established method for its solution.

This work will require all the money and energy that tuberculosis associations and their allies can muster. There will be no time to divert to other conditions and diseases, or will there be time for tangential excursions on projects based upon theory, personal opinion and the like. Indeed, enough work remains for the eradication of tuberculosis to occupy the remainder of the lives of all persons engaged in this field today with considerable left over for their successors. Eradication will be attained by persons devoted to the service with a thorough understanding of the tubercle bacillus and the disease it produces and a clear vision of the goal.

JAY ARTHUR MYERS, M.D.

Notices . . .

UNIVERSITY OF MINNESOTA CONTINUATION COURSES

A course in Surgery will be held April 7 to 9, and will be concerned primarily, but not exclusively, with pediatric surgery. Guest speaker will be Dr. Robert Gross, Harvard Medical School and surgeon-in-chief of the Children's Hospital, Boston. He will deliver the annual George E. Fahr Lecture on Tuesday, April 8, at 8:15 p.m. in Owre Amphitheater on the subject "Coarctation of the Aorta."

A course in *Proctology* will be held April 14 to 19. All aspects of anorectal disease will be covered, and two half days will be devoted to operative clinics. Visiting faculty member will be Dr. Garnet W. Ault, professor, department of proctology, Georgetown University.

A course in *Pediatrics* will be held April 21 to 23. Visiting faculty member for the course will be Dr. John M. Adams, professor of pediatrics, University of California, who will also deliver the annual Jackson Lecture on Monday, April 21. The course will be under the direction of Dr. Irvine McQuarrie, professor and head of the department of pediatrics.

A course in *Allergy and Hematology* will be presented May 15 to 17. One day will be devoted to hematologic problems, and the remainder of the session to diagnosis and management of allergic disorders. Dr. Will Cook Spain will be visiting faculty member for the course.

AMERICAN HEART ASSOCIATION

The twenty-eighth annual meeting and twenty-fifth scientific session of the American Heart Association will be held Thursday, April 17 to Sunday, April 20, at the Hotel Statler in Cleveland, Ohio.

BOOK REVIEWS

Antibiotic Therapy, by Henry Welch, Ph.D. and Charles N. Lewis, M.D., 1951. Washington, D.C.: The Arundel Press, Inc. 561 pages. $10.00.

This book presents an up-to-date account of the present antibiotics. A brief historical sketch is given under the discovery and preparation of each of these substances, all with a biographical sketch of the discoverers.

The various conditions for which each preparation has been found valuable experimentally and in human cases are presented as well as dosage and methods of administration. Side effects of each antibiotic and methods of preventing them as far as possible are also included.

Each chapter contains a list of well chosen references. A carefully prepared index is most useful. This book is highly recommended to all physicians who prescribe antibiotics.

J.A.M.

•

The Merck Manual. Eighth edition. By various authors. Price, $4.50, regular edition; $5, thumb-indexed edition. Pp. 1,592. Merck and Company, Inc., Rahway, New Jersey, 1950.

This volume of nearly 1600 pages is dedicated to the doctor of medicine and his colleagues and aides in the allied professions.

Although this is the eighth edition, it is a completely new book. More than 100 American clinicians served as authors or consultants in its preparation. Up-to-date diagnostic and therapeutic procedures and preventive measures are presented on all of the common and many of the more rare diseases. Etiology and pathology are also included.

A section is devoted to clinical emergencies, including burns, venomous bites and stings, poisoning, and drowning. Routine immunization procedures, office laboratory procedures, and a large volume of other material and information needed daily by physicians everywhere are included.

The value of this book is indicated by its popularity, the first printing of over 75,000 copies having been oversubscribed before it left the press in May 1950. Another printing was necessary in August, and a third in March 1951. This book should be within ready reach of every physician. J.A.M.

The Management of Obstetrics Difficulties, by Paul Titus, 4th edition. St. Louis, Missouri: C. V. Mosby Company. $14.00.

This fourth edition of "Obstetric Difficulties" remains the best book in the field of abnormal obstetrics. It should be considered in two parts —introduction and text.

From his wide experience as teacher, as a specialist in obstetrics and gynecology, as secretary to the American Board of Obstetrics and gynecology, as secretary to the Council of all the American Boards and as consultant to the Armed Services, Paul Titus in his introduction surveys the practice of Medicine and skillfully defines the place of obstetrics and gynecology in the field of medicine today. The introduction is worthy of special reprint in pamphlet form.

The subject matter of the text has been carefully reviewed in the light of current literature, especially the newer advances since World War II. As in previous editions the author reviews the literature to date in each subject of abnormal obstetrics. Thus having reviewed a problem and benefitting from his experience he then describes his favored methods of diagnosis and treatment. Thus one gets a complete picture of each subject with the preferred treatment by one of wide experience.

In these days when the physiological aspects of "natural childbirth" are being so widely discussed in lay and medical literature it might be well to consider this statement by Dr. Titus—"The medical attendant should never take the attitude of regarding labor as a simple physiological process to which he condescends to lend his assistance, but rather should look upon it as a procedure which may present emergencies to tax his best surgical, medical and obstetric skill and judgment, often without much warning." (Chapter xvi, page 465.)

This textbook should be available to everyone practicing obstetrics. Our present record in maternal and neonatal mortality can best be maintained and improved by frequent reference to its teachings.

The recent untimely death of Dr. Titus again removes one of our medical giants. It is hoped that someone will take over his task and bring forth future editions in the spirit and tradition of the original author.

•

A Translation of Galen's Hygiene, by Robert Montraville Green, M.D., 1951. Springfield, Illinois: Charles C Thomas, Publisher. 277 pages. $5.75.

Claudius Galen, a close follower of Hippocrates' work, was the most prolific of the ancient medical writers. During his early professional life he spent much time in travel in order to learn from leading physicians and scientists. He read nearly everything that had been written during the previous several centuries, and thus familiarized himself with books in the field of medicine. He was a sound thinker who frequently attacked theories of his predecessors and contemporaries, but supported those which seemed logical. His keen observations of persons suffering from various diseases, his study of drugs in use in many lands, his interest and activity in every phase of medicine, together with his voluminous writing on so many subjects, mostly in the last three decades of his life (170 to 200 A.D.), have resulted in making him one of the most remarkable figures in medical history. "Actually Galen was a thousand years ahead of his time and it took mankind over 10 centuries to catch up with him," says one commentator. "For nearly 1500 years he ruled the medical world and many of his words, thoughts and phrases are not only embedded in our medical canon, but current in our daily speech."

Galen's books have not been available in the English language until Dr. Sidney Licht recently arranged for English translations of some of his most important writings. This volume is the first translation into any modern language of *Galen's Hygiene*.

The reader at once becomes fascinated with the thinking, practice, accomplishments and "startling anticipations of future discoveries" of one who worked so long ago.

J.A.M.

Program of the Sixty-fifth Annual Meeting of the North Dakota State Medical Association

Gardner Hotel, Fargo, North Dakota

May 10, 11, 12 and 13, 1952

Saturday, May 10—Meeting of the House of Delegates and the Council of the Association.

Sunday, May 11—Second session of the House of Delegates and the Council of the Association. 6:00 p.m.—Mixer, for doctors and their wives, Moorhead Country Club.

Monday, May 12—

8:30–9:30 a.m.—Registration and view exhibits.

9:30–10:00 a.m.—*Results of Miniature Chest Survey in North Dakota,* by Dr. H. M. Berg, radiologist, Quain and Ramstad Clinic, Bismarck, North Dakota.

10:00–10:30 a.m.—*X-ray Diagnosis of Ulcerating Lesions of the Stomach,* by Dr. Harold O. Peterson, Miller Hospital, St. Paul, Minnesota.

10:30–11:00 a.m.—Intermission and view exhibits.

11:00–11:30 a.m. — *Common Causes of Hematuria and Their Treatment,* by Dr. Frederick F. B. Foley, 228 Lowry Building, St. Paul, Minnesota.

11:30–12:00 a.m. — *Common Problems in Office Gynecology,* by Dr. John A. Haugen, 100 East Franklin, Minneapolis, Minnesota.

2:00–2:30 p.m.—*Newer Concepts in the Treatment of Infectious Diseases in Children,* by Dr. Franklin Top, Pediatric Department, University of Minnesota Hospitals, Minneapolis, Minnesota.

2:30–3:00 p.m. — *Small Bowel Tumors,* by Dr. Robert F. Nuessle, Quain and Ramstad Clinic, Bismarck, North Dakota.

3:00–3:30 p.m.—Intermission and view exhibits.

3:30–4:00 p.m. — *Management of the Cross-eyed Child,* by Dr. T. G. Martens, Mayo Clinic, Rochester, Minnesota.

4:00–5:00 p.m.—Fracture Clinic—Dr. E. C. Henrikson, 407 Doctors Bldg., Minneapolis, Minnesota; Dr. Daniel Moos, Medical Arts Bldg., Minneapolis, Minnesota; Dr. M. C. Nelson, Medical Arts Bldg., Minneapolis, Minnesota.

Monday, May 12—

8:00 p.m.—Special Concert, Fargo-Moorhead Symphony Orchestra. Guest Artist, Rafael Druian, Concertmaster of the Minneapolis Symphony Orchestra. (For doctors and their wives, guests, guest speakers, etc.)

Tuesday, May 13—

9:00–9:30 a.m.—*Salient Points of an Autopsy,* by Dr. James D. Cardy, Grand Forks, North Dakota.

9:30–10:00 a.m.—*Management of Bleeding Lesions of the Digestive Tract,* by Dr. J. A. Bargen, Rochester, Minnesota.

10:00–10:30 a.m.—*Diagnosis and Treatment of Benign and Border-line Breast Lesions,* by Dr. O. J. Campbell, Minneapolis, Minnesota.

10:30–11:00 a.m.—Intermission and view exhibits.

11:00–11:30 a.m.—*The Blood Pressure Problem,* by Dr. Edward L. Bortz, Philadelphia, Pennsylvania.

2:00–2:45 p.m.—*Presidential Address,* by Dr. W. E. G. Lancaster, Fargo, North Dakota. *Inaugural Address,* by Dr. O. W. Johnson, Rugby, North Dakota.

2:45–3:15 p.m.—*Recent Advances in the Diagnosis and Treatment of Diseases of the Thyroid,* by Dr. Ray F. Farquharson, Toronto, Canada.

3:15–3:30 p.m.—Intermission and view exhibits.

3:30–4:30 p.m.—A Panel Discussion on *The Clinical Problem of Jaundice,* by Dr. Ray F. Farquharson, Moderator; Dr. O. J. Campbell, Dr. J. A. Bargen, Dr. James D. Cardy .

4:45 p.m.—Drawing for Door Prize.

5:00 p.m.—Smorgasbord, Fargo Country Club, for doctors and exhibitors.

SPECIAL LUNCHEONS

Monday, May 12—

(1) 12:30 p.m. — Elks Club — North Dakota Radiological Society. Guest speaker, Dr. Harold O. Peterson, St. Paul.

(2) 12:30 p.m.—Colonial Room, Gardner Hotel—North Dakota Eye, Ear, Nose and Throat Society. Guest speaker, Dr. T. G. Martens, Rochester, Minnesota, will speak on *Problems of Presbyopia.*

(3) 12:30 p.m.—South Room, Gardner Hotel—North Dakota Society of Obstetrics and Gynecology. Guest speaker, Dr. John A. Haugen, Minneapolis, Minnesota.

(4) 12:30 p.m.—Parlors B and C, Gardner Hotel—North Dakota Pediatric Society. Guest speaker, Dr. Franklin Top, Minneapolis, Minnesota.

(5) 12:30 p.m. — East Room, Gardner Hotel — The Dakota-Manitoba Urologic Society. Guest speaker, Dr. Frederick F. B. Foley, St. Paul, Minnesota.

Tuesday, May 13—

(1) 12:30 p.m. — Colonial Room, Gardner Hotel — North Dakota Diabetic Association. Guest speaker, Dr. Edward L. Bortz, Philadelphia, Pennsylvania, member of the Council of the American Diabetic Association.

Thirtieth Annual Meeting, American College Health Association

Copley Plaza Hotel, Boston, Massachusetts

May 1, 2 and 3, 1952

WEDNESDAY, APRIL 30, 1952

7 p.m.—Council Dinner—*Parlor "C"*

THURSDAY, MAY 1, 1952

9 a.m.—Registration—*Lobby*

Exhibits—All day and evening—*State Suite*

Morning Session—10 to 12

Sheraton Room

10:00 a.m.—Call to Order—Dana L. Farnsworth, M.D., Massachusetts Institute of Technology, Chairman of Committee on Arrangements.

10:15 a.m.—President's Address—John E. Sawhill, M.D., New York University.

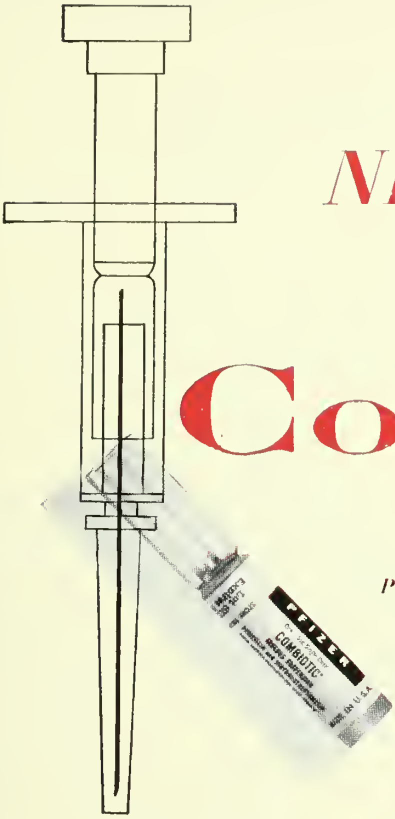
10:30 a.m.—Address: *What's on the Student's Mind? Findings of Recent Research* — Gordon Willard Allport, Ph.D., Professor of Psychology, Harvard University.

Luncheon Period—12:00 to 1:30

Afternoon Session, 1:30 to 3:30

Sheraton Room

1:30 p.m.—*The Dartmouth Outing Club, a Medium for Human Development: What is the Outing Club?*—John A. Rand, Executive Director; *What Does It Do for Health Education?* — Stuart W. Russell, M.D., Instructor in Orthosurgery, Dartmouth Medical School; *How Does It Foster Development?*—Ralph W. Hunter, M.D., Medical Director, Dartmouth College.



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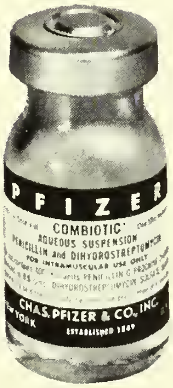

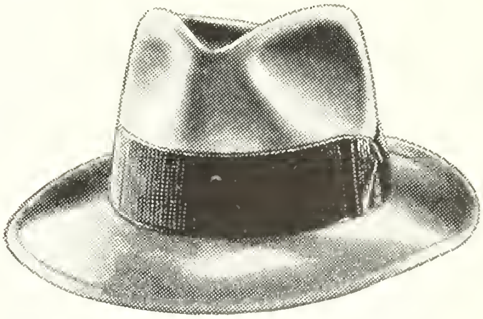

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2:30 p.m.—*Antibiotics in the Management of Common Infectious Diseases*—Chester S. Keefer, M.D., Wade Professor of Medicine, Boston University School of Medicine; Physician-in-Chief, Massachusetts Memorial Hospital.

3:00 p.m.—*The Serious Recurrent Injuries of Athletics—Contraindication for Further Competitive Participation*—Augustus Thorndike, M.D., Chief Surgeon, Dept. of Hygiene, Harvard College and Harvard Athletic Association. Acting Director: Prosthetic and Sensory Aid Service, Veterans' Administration.

4:00 p.m.—Buses leave on sight-seeing trip to Concord and Lexington.

5:30 p.m.—Buses arrive at Bedford Road, Lincoln, for Reception at Home of Dr. and Mrs. John P. Monks.

6:30 p.m.—Buses leave Lincoln for Copley Plaza Hotel.

8:00 p.m.—Pop Concert—Symphony Hall, Boston. (Tickets on sale at the Registration Desk.)

FRIDAY, MAY 2, 1952

Morning Session, 9:30 to 11:30
Sheraton Room

9:30 a.m.—Symposium on *The Effects of the Educator and His Policies on the Self-Development of the Student.* Chairman: John B. McKenna, M.D., Dartmouth College. Speakers: Leo Berman, M.D., Instructor in Psychiatry, Harvard Medical School. John B. Fox, M.B.A., Assistant Dean, Graduate School of Business Administration. Mary F. Langmuir, Ph.D., Chairman of Department of Child Study, Vassar College. Judson Shaplin, A.M., Assistant Dean, Graduate School of Education, Harvard University. Discussion by Dana L. Farnsworth, M.D., Massachusetts Institute of Technology, and E. Francis Bowditch, A.B., Dean of Students, Massachusetts Institute of Technology.

12:00 noon — Association Luncheon. Speaker: James H. Means, M.D., Massachusetts Institute of Technology.

Afternoon Session, 1:30 to 4:00

2:00 p.m.—Report of Committees of American College Health Association.

3:30 p.m.—Business Meeting. Election of Officers.

4:15 p.m.—Buses leave for Massachusetts Institute of Technology.

4:30 p.m.—Open House at Massachusetts Institute of Technology—Homberg Memorial Infirmary.

6:30 p.m.—Council Dinner.

SATURDAY, MAY 3, 1952

Morning Session, 9:30 to 12:00
Sheraton Room

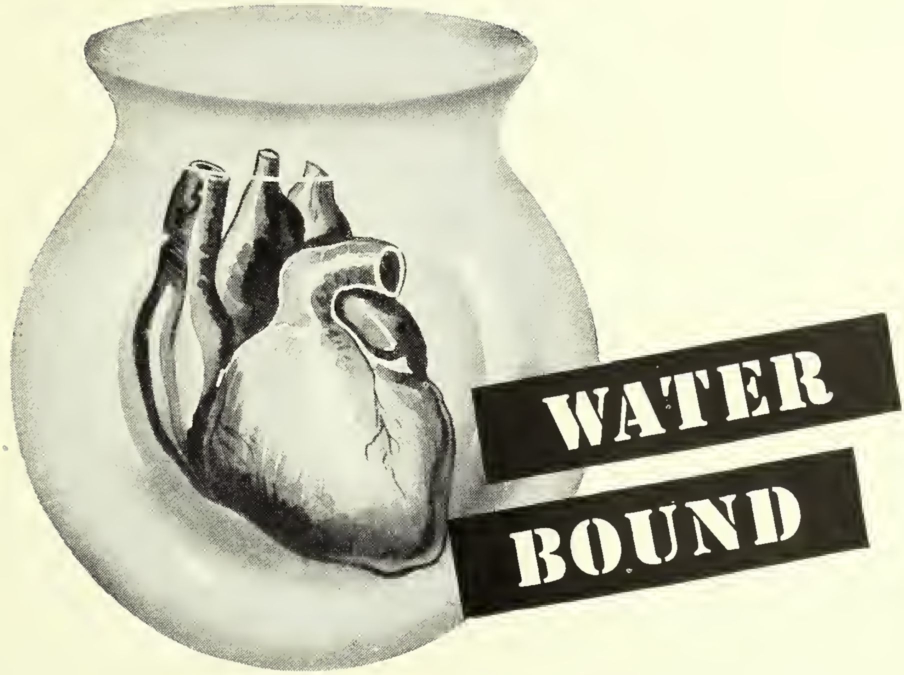
Chairman: Arlie V. Bock, M.D.
Henry K. Oliver Professor of Hygiene,
Harvard University

9:30 a.m.—*Impressions of Student Health Services in Great Britain*—Ruth E. Boynton, M.D., Director, Students' Health Service, University of Minnesota.

10:00 a.m. — Panel Discussion: *The Inter-Relation of Guidance Functions on a College Campus.* Speakers: Delmar Leighton, M.B.A., Dean of Freshmen and Chairman of Board of Faculty Advisers, Harvard College. Leigh Hoadley, Ph.D., Professor of Zoology and Master of Leverett House, Harvard College. William G. Perry, Jr., A.M., Director of the Bureau of Study Counsel, Harvard College. Gaylord P. Coon, M.D., Psychiatrist, Harvard University.

11:30 a.m.—Council Report.

12:00 noon—Adjournment of Thirtieth Annual Meeting.



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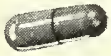

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News Briefs . . .

North Dakota

Three North Dakota cities—Garrison, Lisbon and Watford City—are celebrating the opening of new community hospitals this spring. The new 40-bed Memorial hospital in Garrison, which took $434,000 and six years to build, was open for patients the first of March, and will be dedicated at community ceremonies on Memorial Day.

The Lisbon Memorial hospital, built at a cost of $240,000, was opened early in February. The staff of the hospital includes Dr. Hans Bakke, chief of staff, Dr. A. K. Lewis, assistant chief of staff, Dr. S. C. Bachellor, secretary-treasurer, Dr. George Haynes, Dr. Abner Veitsch, and Dr. D. W. Nagle. In addition, doctors of the Dakota clinic in Fargo are associate members.

Open house was held at the 14-bed McKenzie County Memorial hospital at Watford City on March 10. Dr. P. O. C. Johnson and Dr. A. H. Lamal are staff members of the new hospital.

* * *

A hospital staff was organized at the General hospital in Devils Lake in February to conform with the requirements and standards of the American College of Surgeons. Officers elected were Dr. W. F. Sihler, president; Dr. G. W. Toomey, vice president, and Dr. C. A. Corbett, secretary.

* * *

Dr. V. A. Mulligan was re-elected chief of staff at Mercy hospital, Langdon, at the annual meeting in February. Dr. A. F. Panek of Milton is vice president and Dr. A. D. Strom, secretary-treasurer.

* * *

Dr. John H. Moore, Grand Forks, will present a paper on "Obstetric Hemorrhage" as part of the Symposium on Maternal Mortality at the Fifth American Congress on Obstetrics and Gynecology in Cincinnati, April 1. Dr. J. Robert Willson, Temple University school of medicine, will serve as moderator. Dr. Moore is one of the directors of the sponsoring American Committee on Maternal Welfare and also state attendance chairman.

* * *

Dr. J. M. Muus of McVille has been appointed county health officer for a one year term.

Minnesota

The University of Minnesota medical school has been awarded more than $31,000 in new grants from the Life Insurance Medical Research fund for further study of heart disease. The two grants are: For research by Dr. Nathan Lifson on transcapillary exchange of material in perfused organs, $16,200. For research by Dr. Maurice B. Visscher on cardiovascular renal physiology, $15,335.

* * *

Dr. Leonard F. Peltier, clinical instructor in orthopedics at the University of Minnesota school of medicine, has receive a grant of $30,000 from the John and Mary R. Markle Foundation to do medical research in orthopedic surgery.

* * *

A sectional meeting of the American College of Surgeons was held March 24 to 26 at the Radisson hotel in Minneapolis. Dr. Harvey Nelson was in charge of arrangements, with council members of the Minneapolis Surgical society.

Dr. Donald B. Frane is new chief of staff at Fairview hospital; Dr. R. A. Hoffman, vice chief of staff; Dr. D. B. Simonson, secretary, and Dr. H. J. Brekke, treasurer. The executive committee includes Dr. R. W. Koucky, Dr. R. T. Siderline, Dr. C. Gordon Watson and Dr. L. J. Roberts.

* * *

Dr. C. S. Youngstrom, a graduate of the University of Nebraska medical school, has joined the staff of the East Range Clinics in Virginia and Eveleth.

ANTIMICROBIAL TREATMENT OF PULMONARY TUBERCULOSIS

(Continued from page 184)

longed drug program. Transactions of the Eleventh Conference on Chemotherapy of Tuberculosis (VA): In press.

21. Fischer, B. M., Roberts, G. and Hinshaw, H. C.: The subcutaneous administration of the sodium salt of PAS in the treatment of tuberculosis. Am. Rev. of Tuberc. 64:557, 1951.
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THE TUBERCULIN TEST AS AN EVALUATION OF THE FUTURE OF TUBERCULOSIS

(Continued from page 198)

the least amount of error, the rate of infection among our high school students has been reduced a little more than 4½ times. Knowledge of the infection rate in any community gives us a positive indication of what is happening to the tuberculosis problem in any area. A constantly falling infection rate is most desirable, and points toward the ultimate eradication of tuberculosis.

PROLONGED INTERCOSTAL NERVE BLOCK IN UPPER ABDOMINAL SURGERY

(Continued from page 204)

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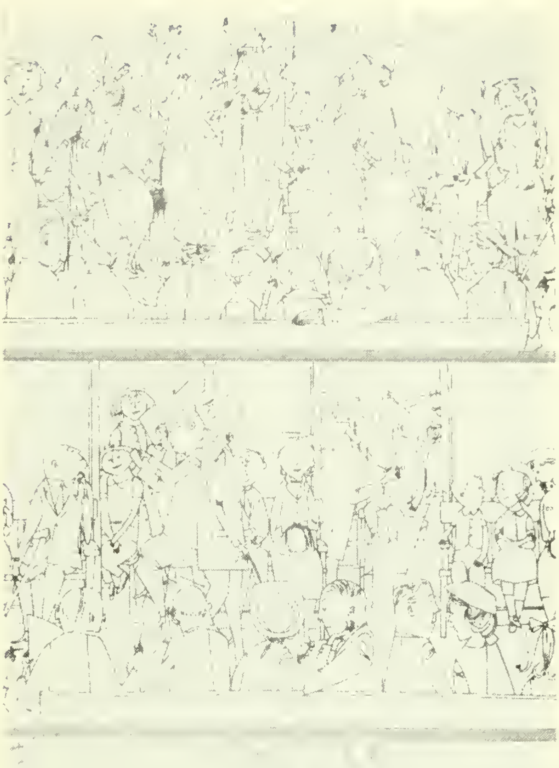

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American College Health Association News

New Jersey State Teachers College, Newark, New Jersey, has been approved for membership in the Association by the Executive Committee. The college has an enrollment of 1,500 full time and 700 part time students, the majority of whom are women. The health department staff includes Miss Vera H. Brooks, associate professor of health education, director; a part time physician and a full time nurse.

Kansas State College will have a vacancy on the health service staff beginning September 1, 1952, for a woman physician under forty-five years of age. For further information, contact: B. W. Lafene, M.D., Director, Student Health Service, Kansas State College of Agriculture and Applied Science, Manhattan, Kansas.

A definite trend in the college health service is the employment of psychiatrists. From the 135 returned survey forms, seventy-five colleges and universities reported either a full time or part time psychiatrist on the staff. About twenty-five institutions have one or more full time psychiatrists. Thirty-one institutions reported that mental hygiene services are offered to students by psychologists or physicians without psychiatric experience. Thus, approximately eighty per cent of these colleges and universities are providing mental health services to the students.

Are these institutions offering classroom instruction in mental health? Sixty-one or slightly less than half report mental health courses, usually on the elective basis. The course is generally offered by the psychology or the education department.

A very small number of institutions state that a psychiatrist is responsible for classroom instruction in mental health, whereas a larger number report a physician in charge of instruction.

From the survey forms, the compiler would conclude that nineteen of the one hundred and thirty-five institutions made little provision for either mental health service or instruction in mental health by the health service.

ROUTINE PHOTORADIOGRAPHY IN A GENERAL HOSPITAL

(Continued from page 191)

Using such an approach to the problem, a general hospital becomes one of the finest components of the community-wide tuberculosis control program. It will protect all patients and personnel against unsuspected and unwarranted exposure to tuberculosis. More than this, it will enable all physicians in their own localities to help eradicate tuberculosis.

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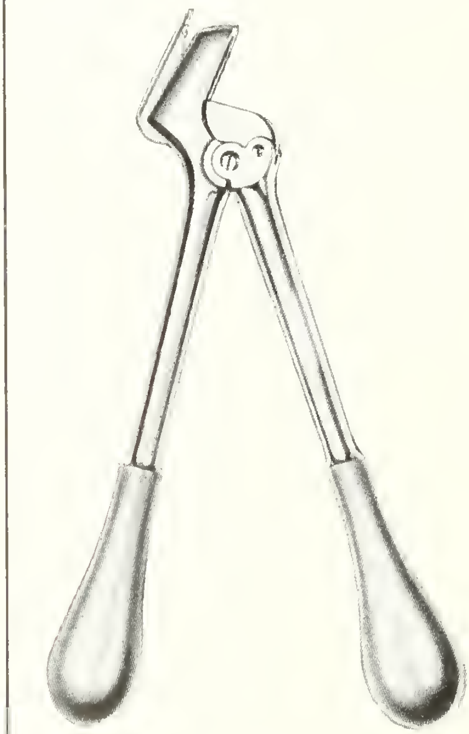

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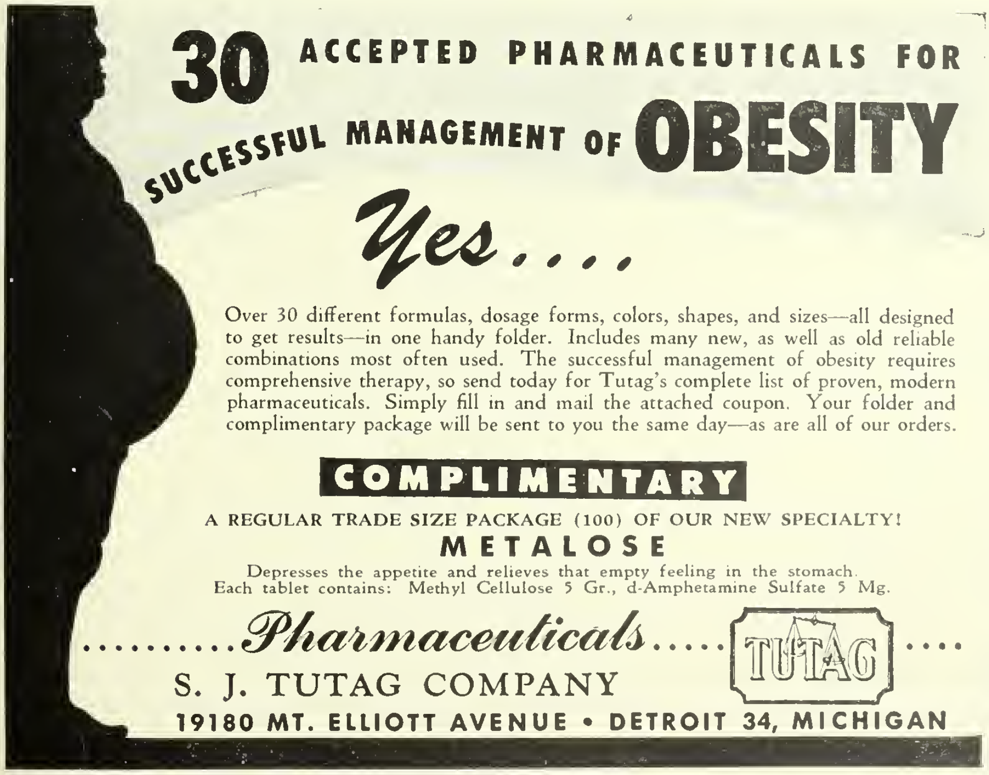

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ROUTINE PHOTORADIOGRAPHY
IN A GENERAL HOSPITAL

(Continued from page 226)

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International Meetings

Commonwealth and Empire Health and Tuberculosis Conference, Central Hall, London, England, July 8-13. Dr. J. H. Harley Williams, Tavistock House North, Tavistock Sq., London, W.C.1, England, Secretary General.

Congress of the International Diabetes Federation, Leyden, Netherlands, July 7-12. Dr. F. Gerritzen, 33, Prinsegracht, The Hague, Netherlands, Secretary.

European Congress of Cardiology, University of London, Bloomsbury, W.C.1, England, Sept. 10-12. Dr. K. Shirley Smith, 35 Wimpole St., London, W.1, England, Secretary.

European Society of Cardiovascular Surgery, Strasbourg, France, Oct. 3-4. Sir James Learmonth, Department of Surgery, University New Buildings, Edinburgh 8, Scotland.

Interamerican Cardiological Congress, Buenos Aires, Argentina, Aug. 31-Sept. 7. Dr. Blas Moia, Larrea 1132, Buenos Aires, Argentina, Secretary-General.

International College of Surgeons, Madrid, Spain, May 20-24. Dr. Max Thorek, 850 West Irving Park Road, Chicago, Ill., U. S. A., Secretary-General.

International Congress of Dermatology and Syphilology, London, England, July 21-26. Dr. Gordon B. Mitchell-Heggs, 5, Lisle St., London, W.C.2, England, General Secretary.

International Congress on Diabetes, Leyden, The Netherlands, July 7-12. Dr. F. Gerritzen, 33, Prinsegracht, The Hague, The Hague, Netherlands.

International Congress of Haematology, Mar del Plata, Argentina, Sept. 21-26. Dr. Carlos Reussi, Anchorena 1710, Buenos Aires, Argentina, Secretary.

International Congress of Internal Medicine, Friends House, London, N.W.1, Eng. Sept. 15-18. Sir Harold Boldero, 12 Pall Mall East, London, S.W.1, England, Secretary.

International Congress on Neuropathology, Rome, Italy, Sept. 8-13. Dr. Armando Ferraro, 722 W. 168th St., New York, N. Y., U. S. A., Secretary General.

International Congress of Physical Medicine, London, England, July 14-19. Dr. A. C. Boyle, 45, Lincoln's Inn Fields, London, W.C.2, England, Hon. Secretary.

International Union Against Tuberculosis, Rio de Janeiro, Brazil, Aug. 24-27. Prof. Etienne Bernard, 66 Blvd. St. Michel, Paris 6e, France, Secretary-General.

The Journal Lancet
SERVING THE MEDICAL PROFESSION OF MINNESOTA,
NORTH DAKOTA, SOUTH DAKOTA AND MONTANA

Diagnosis and Treatment of Dyslalia

SPENCER F. BROWN, M.D.[*]
Minneapolis, Minnesota

Of all the disorders of speech, by far the commonest is the type of indistinct utterance which is technically termed dyslalia. We may define dyslalia as a defect of articulation of one or more sounds which is not associated with mental retardation, hearing impairment, or significant abnormality of the organs of speech (lips, tongue, teeth, palate, etc.) or their nervous control.

Between 75 and 80 per cent of all speech defectives fall into the category of dyslalics. This means that about 8 per cent of all school children have some degree of dyslalia. In many instances the defect is so slight as to escape notice, and would be detected only by an expert. Such cases usually present a mild distortion in the articulation of a single sound, most often *s*. While such a condition is, strictly speaking, a speech defect, it is actually of no clinical significance. Over half of all dyslalics are of this mild degree.

The problem of the rest of the dyslalic children is not quite so inconsequential. In terms of numbers, there are probably about 2,000,000 school children whose articulatory defects are numerous and severe enough to constitute a barrier to effective communication and thus to adequate social adjustment. In the most pronounced cases the speech is practically unintelligible. It is not difficult to understand the effects of such speech problems upon the children presenting them. Many children are teased because of their "baby talk." They may become shy and withdrawn, fearing to speak because of expected ridicule. In many instances they have been failed in school because their speech was too indistinct to be understood, even though their school work may have been otherwise good. In older patients one may find many cases who have been refused jobs because of defective speech.

The diagnostic criteria which apply to dyslalia are implied in the definition of the condition given at the outset. It is, of course, necessary to be certain that the patient actually has a speech defect, and hence a careful evaluation of his speech is the first order of business. As carried out by a speech pathologist, the speech examination of the patient consists in eliciting all the speech sounds and recording the types of errors made. The errors may be divided into substitutions of one sound for another, distortions, omissions, and (less common) additions of sounds. A complete test will include each sound in all positions in which it occurs in the language. For younger children the sounds are elicited by means of a picture test, asking the child to name familiar objects. Older children and adults can be tested by means of word lists or sentences. The patient's ability to produce each sound in imitation of the tester is also determined. Finally his general intelligibility is rated.

The results of the speech test must be interpreted in the light of proper standards for the patient's age. The substitutions and other imperfections in the speech of a three year old do not constitute errors in the proper application of that term, and they are not indicative of defective speech at that age. The same performance in a child of five and one-half might be regarded as borderline, while in a child a year older it might indicate a clearcut defect. The degree of intelligibility of the child is of greater importance than the number of defective sounds, though obviously there is a fair correlation between these two.

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[*] From the department of pediatrics, University of Minnesota Medical School, Minneapolis, Minnesota.

The physical examination of the organs of speech is next in the routine. One should be careful not to attach importance to minor deviations in dental occlusion, size and shape of palate and tongue, or to a short lingual frenum. Clipping of the frenum rarely if ever results in spontaneous improvement in articulation, and often actually makes the speech worse.

One must be sure that the patient has sufficient intelligence to be capable of normal speech. We are dealing here with a learning process, and if the patient's intelligence is below normal so that all learning is somewhat slowed, we can expect that his ability to learn to produce normal speech will also be impaired. Unequivocal evidence of normal intelligence is therefore necessary. Since it is always difficult to evaluate the history of development and performance of tasks requiring intelligence, the best evidence is a psychologic examination by a competent clinical psychologist.

It is also necessary to know as precisely as possible the hearing acuity the child possesses. Many children with impaired hearing go unrecognized by their parents and teachers. Hearing losses of 20 to 25 decibels often result in defective speech, and when the loss is greater for high frequencies the speech may be strikingly distorted. The rehabilitation of these patients with hearing losses is handled differently from those with functional problems. For this reason and because of the obvious importance of proper otologic treatment of the hearing impairment, it is important that adequate evaluation of the hearing be made in every patient who presents a defect of articulation. Only those with normal hearing can be diagnosed as dyslalics.

For those patients who meet the criteria for diagnosis as dyslalics, the prognosis is generally good. This statement, unfortunately, must be immediately qualified by the proviso that the patient must receive competent speech therapy. Unfortunately there has been a tendency to minimize the importance of dyslalia, and many parents, teachers, and even physicians have assumed that normal maturation would take care of the problem. Even some of the terms often used as synonyms of dyslalia – "baby talk," "infantile speech perseveration"– seem to carry the implication that the child will outgrow his defect. Actually, careful studies have shown that little or no spontaneous improvement can be expected after the age of eight. Hence any child of this age who presents a noticeable dyslalia should be referred to a speech therapist. Many children as young as four should be regarded as candidates for speech therapy, depending on the severity of the defect, the intelligence, and other factors.

Although the physician will not himself carry out speech therapy, he will be interested in the general principles of retraining of dyslalic patients. Usually it is advisable to work on only one sound at a time. The first stage is that of ear training. The child must become aware of the correct sound and consistently able to distinguish it from his errors. He is then taught the correct mode of production of the sound, usually by a trial-and-error method. If the ear training has been adequate, the trials needed are few. The correct production of the sound must then be habituated, and gradually the carry-over is made to everyday speech outside the clinical situation.

The sad fact is that the number of trained speech therapists is pitifully small—only about 5 per cent of the estimated need. Most speech defectives will thus get inadequate treatment or none at all. A natural solution for many children would seem to be treatment at home. If this is contemplated, supervision from a competent speech therapist should be sought, for more harm than good is often done by mothers whose well-intentioned efforts often prove to be little more than nagging. With awareness on the part of physicians as to the importance of these – and other – speech defects and the possibilities of effective treatment, better use can be made of existing personnel and facilities for speech therapy.

> The child that is hungry must be fed; the child that is sick must be nursed; the child that is physically or mentally handicapped must be helped; the maladjusted child must be reeducated; the orphan and the waif must be sheltered and succoured.
>
> Declaration of the Rights of the Child,
> International Union for Child Welfare, Geneva

Cancer, A Major Child Health Problem*

HAROLD W. DARGEON, M.D.†

New York City

THE RESPONSIBILITY for the solution of any child health problem is shared in varying degrees, depending upon the nature of the problem, by parents, community and physician.

In the neoplastic field parents must know that children may develop tumors of many varieties and at any age. They must also realize that almost 50 per cent of the deaths from these diseases in the juvenile period occur during the first five years of life.[1] They should be aware that although the high case mortality places cancer and its allies among the first four important causes of death of American children, between the ages of one and fifteen, there are innumerable instances of cures, excluding leukemia, of most of the varieties of malignant as well as benign tumors. Furthermore, palliative therapy of most hopeless cases has extended the life span of many children. There is good reason to believe that with improved methods of therapy and earlier diagnosis a greater percentage of cures may be anticipated during the coming years. Finally parents should appreciate that the many anatomic sites which may be involved can produce a multitude and variety of signs, so that most acute and subacute as well as chronic syndromes may be simulated by cancer.

The community problem resolves itself into one of education and not an education of fear, but of fact.

The physician's problem in this effort is one of self education, early diagnosis, prompt and comprehensive therapy and rehabilitation. A casual reflection will make it apparent that one physician, practitioner, pediatrician, surgeon, roentgenologist, radiotherapist, dermatologist or pathologist can not be expected to cope with the multitude of problems which occur when a child has cancer. All the specialists, including obstetricians, at one time or other may be involved in caring for such a patient. The limitations of each must be recognized by all for the successful conclusion we are seeking, namely, the earliest possible restoration of health and the future social adjustment of the cured individual, who may have some serious physical or psychological handicap to surmount.

The neuroblastoma illustrates the difficulties which may be encountered by various members of the medical team. The primary site of this tumor may be in the head, neck, thorax, abdomen, pelvis or skin. The evidence of metastases may present earlier than those of the primary site. The symptoms may vary widely and be confused with many other morbid processes. Roentgenographically the primary tumor may or may not be recognizable. The presence of calcified areas within the mass is not pathognomonic for teratomas and Wilms' tumors may also show such opacities. Histologically the classic rosette pattern of small cells with heavily staining nuclei, little cytoplasm and limited stroma may be absent. The differentiation between neuroblastoma, lymphoma, rhabdomyosarcoma, reticuloendotheliosis cannot always be made by the pathologist. Surgical removal is the treatment of choice but the technical difficulties encountered may preclude extirpation. Radiotherapy is used with success in some instances.[2] Chemotherapy is currently under investigation. The child who survives such a disease may have a disfigurement or physical disability. The parents have undergone an ordeal of great magnitude and the potential psychological problems are obviously very considerable.

In a grave, intricate and challenging disease it is quite evident that the cooperation of the parents, the community and all physicians interested in children are required if the child is to receive the very real benefits available to all for the asking.

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*Read in part at the meeting of the North Dakota State Medical Society, Bismarck, North Dakota, May 21, 1951.

†From the Pediatric Service and Children's Tumor Registry, Memorial Center for Cancer and Allied Diseases, New York City.

Carcinoma of the Ovary in Children[*]

With Report of a Case

JAMES W. McGILL, M.D., F.A.C.S.
Superior, Wisconsin

The stimulus to investigate the subject of carcinoma of the ovary in children, grew out of a recent surgical case. It was thought, since it is a relatively rare disease, that perhaps it would be possible to tabulate all of the cases reported in the literature. However, the material reviewed in a rather comprehensive bibliography was in great part beside, rather than on, the subject. All of it concerned tumors of the ovary, but many of the references had to do with wholly benign tumors, and a large number were concerned with ovarian cysts with twisting of the pedicle. Because there are gaps in continuity, it is not felt that this report covers all of the reported cases, but it does bring the subject relatively up to date, and presents an opportunity to discuss an important, if somewhat rare condition, and also to report an additional case.

The incidence of carcinoma of the ovary in children is low. Dargeon says that cancer is a rare disease in childhood but that ovarian tumors are the most frequent forms of carcinoma of the genitals in children, whereas in adult life they form a relatively low percentage of all cases affecting the genital organs. In the opinion of Dockerty, ovarian carcinoma is seldom observed in children. Taussig observes, nevertheless, that the most common site of neoplasms in childhood is the ovary. The two opinions are not necessarily in conflict, as one concerns all neoplasms, the other malignant neoplasms. Dargeon makes the interesting observation that carcinoma of the breast, uterus and ovaries in the female, and carcinoma of the stomach, intestines and prostate in the male, which comprise such a large group of neoplasms in the adult, are so infrequent as to be curiosities in the juvenile group. Costin and Kennedy said, in an article published as recently as 1948, "From our review of the literature, it was evident that data have been reported on more than 200 ovarian tumors in infants and children. About one third of these were cysts, one fourth dermoid cysts, and more than one third either carcinoma or sarcoma." That would mean roughly 70 reported cases of carcinoma or sarcoma of the ovary in the entire literature, making even the one case reported herewith, a curiosity. Wiel is responsible for the interesting notation that malignant tumors of the ovary are more common among young patients than among patients seventy years of age or more. Ziegler has reported a case of bilateral ovarian carcinoma in a fetus of thirty weeks gestation.

In passing, it might be well to tabulate the types of malignant tumors of the ovary. Novak lists them as follows:

MALIGNANT TUMORS OF THE OVARY

I. *Primary solid carcinoma of the ovary*
  1. Adeno-carcinoma
  2. Medullary carcinoma
  3. Carcinoma simplex
  4. Scirrhus carcinoma
  5. Alveolar carcinoma
  6. Plexiform carcinoma

II. *Primary cystic carcinoma of the ovary*
  1. Pseudo-mucinous cyst-adeno-carcinoma
  2. Serous cyst-adeno-carcinoma
  3. Secondary carcinoma in dermoids

III. *Other malignant tumors of the ovary*
  1. Krukenberg's tumor
  2. Sarcoma of the ovary
  3. Teratoma (including struma ovarii)
  4. Dysgerminoma

IV. *Functioning tumors of the ovary*
  1. Granulosa cell carcinoma
    a) Thecoma
    b) Luteoma
  2. Arrhenoblastoma

The diagnosis is usually made accidentally, because so few characteristic symptoms or findings are present. Hunt and Simon note that the symptoms of carcinoma of the ovary in children and infants are general and special. "The general symptoms consist of the presence of an abdominal tumor which usually increases in size rapidly and is often discovered accidentally. It occupies the abdominal rather than the pelvic cavity, because in children the uterus and adnexa are abdominal and not pelvic organs." (For this reason, Davenes has pointed out that symptoms from pressure on the bladder and rectum are seldom present). "There is usually accompanying loss of weight; pain is associated only with torsion, with intestinal obstruction, or with enlargement of the tumor." Special symptoms, such as sexual precocity, suggest a feminizing tumor—granulosa cell, thecoma, luteoma; masculinization suggests an arrhenoblastoma.

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[*] Presented before a joint meeting of the Minnesota, Wisconsin, North Dakota and Iowa Societies of Obstetrics and Gynecology, at St. Paul, Minnesota, December 1, 1951.

In the matter of recognition of the presence of an abdominal tumor, Mayo stresses bimanual exploration of the pelvis with one finger in the rectum as a satisfactory element of physical examination, and states also that in certain cases of dermoids, x-ray study may help. Dargeon, reporting from the experience of the Memorial Hospital in New York, says that the average delay from onset to correct diagnosis was about five months. Witzberger and Agerty say that the majority of ovarian neoplasms in children are incorrectly diagnosed, except those causing precocious puberty. Because torsion of ovarian tumors for some reason is commoner on the right side, they have also observed that the most common mistake in diagnosis is appendicitis. Other incorrect diagnoses are: intussusception, mesenteric adenitis, Meckel's diverticulitis with obstruction, and pyelitis. They stress the point that ovarian neoplasms should always be thought of in the differential diagnosis of lower abdominal pain in children.

There is complete unanimity of opinion in the matter of treatment—removal of the involved tube and ovary. The question of what to do with the other ovary presents the principal problem. Murphy says that early operation with removal of both ovaries is the best procedure. Moench points out that preservation of childbearing in young patients is a consideration. Hunt and Simon have adopted a sound policy with reference to surgery in these cases. They state: "Until more cases have been reported with records of the ultimate outcome, it will be impossible to settle this question definitely. There is not enough evidence at present to justify the removal of an apparently normal ovary from a child in the presence of a malignant tumor in the other ovary. If the tumor is benign, the operation should, of course, be as conservative as possible."

The prognosis in general, both in this and in other types of malignancies in children, is unfavorable. Ewing says: "As a rule, malignant tumors of infants and children progress rapidly and metastasize widely, recurrence is prompt, and the mortality is very high." Dargeon echoes the same opinion: "Prognosis for gynecological carcinoma in children is extremely unfavorable." According to Schaefer, ovarian neoplasms in childhood in general differ from the same lesions in adults in that they are more rare, they are more frequently incorrectly diagnosed, and are more commonly associated with complications. In writing about ovarian neoplasms in children, Mayo and Fauster state that surgically, the mortality and morbidity are much lower with ovarian cysts, but that with dermoids and solid tumors, the mortality is correspondingly high; and that unfortunately, the largest percentage of ovarian tumors in children fall within those groups.

CASE REPORT

S. H., a female child, eight years of age, was first seen on May 4, 1950. In retrospect, the parents stated that about three or four months previously she had developed a tendency toward bedwetting and complained of an associated "stomach ache." Her appetite was poorer. Having had other cases of what they described as "stomach flu" in the family, they attached no particular significance to this child's complaints. About two weeks before she was first seen, she began to complain of lower abdominal pain. At this time, the mother noted some hardness of the abdomen, a condition which had not been noticed before. The child had been having some urinary frequency, but it was only noted particularly after she began to complain of pain. At this time no weight loss was noted, the appetite was good, and bowel function was normal. The parents recalled that prior to this time the child had been constipated off and on, and at times had complained of pain in the abdomen, to which they attached no significance.

General physical examination disclosed nothing of note except an impression that the child must have lost weight. The abdomen was prominent and abdominal wall was tense. The enlargement was smooth and symmetrical, and while there appeared to be an unusual firmness on pressure, the outlines of a mass could not be defined. On rectal examination, a mass was palpated which appeared to be situated more toward the right side. Its surface was somewhat irregular, but it gave the impression of a cystic tumor under great pressure, rather than a solid mass.

At operation on May 5, the abdomen was opened through a right paramedian incision. The tumor mass, grayish-pink in color, of somewhat irregular surface, solid, and of the consistency of brain tissue, appeared to occupy most of the abdominal cavity. It was separated without difficulty from the omentum and the pelvic cavity, to which it was attached by soft adhesions. It appeared to be encapsulated without any break in the capsule. It was delivered easily and noted to be of ovarian origin. The tumor and the right tube which was closely attached to its surface were removed. The left ovary appeared to be normal and was not disturbed. The appendix was removed and the abdomen closed.

Postoperative convalescence was singularly without incident, and the child was discharged on the sixth day.

Diagnosis: Carcinoma of the right ovary.

The child appeared to be doing well following the operation, and the parents observed that her school work was better after she returned to school. In July she complained of some abdominal pain and for a time became less active, but then recovered and the indisposition was attributed to an intestinal upset which other children in the family had about the same time. She had a good appetite. On August 31 she was brought to the office for examination. There appeared to be some fullness of the abdomen, but not nearly as marked as it had been originally. There seemed to be an indefinite mass in the left lower quadrant, and on rectal examination it seemed to be cystic.

On September 8 surgery was again performed. The abdominal cavity contained a considerable amount of bloody serous fluid. Two large, and one smaller pedunculated mass were found attached to the omentum. A quantity of friable tissue was evacuated from the cul-de-sac. The left ovary appeared to be cystic and about twice the size it was at the time of the previous operation. One pole of the ovary was covered by the same type of friable material found in the cul-de-sac, and grossly it was not possible to say whether the tissue was attached to the surface or was growing out of the interior of the ovary. The ovary was removed, as were the masses in the omentum, and as much of the friable material from the cul-de-sac as possible, but with the feeling that it had not been completely removed. Hospital convalescence was smooth, and the child was discharged on the sixth day.

Diagnosis: Recurrent carcinoma of the ovary. X-ray treatment was not inaugurated following the first operation, for to have done so would have jeopardized the function of the remaining ovary. However, after the tumor had recurred, deep therapy was given following the second operation. Upon completion of the prescribed course of therapy, the child was re-examined. Her color was good, she had gained weight, and by external palpation there was no evidence of abdominal tumor. A month later examination revealed recurrent masses in the abdominal wall. The patient went rapidly down hill and died in late December.

SUMMARY AND CONCLUSIONS

1. Carcinoma is a rare disease in childhood.
2. The most common site of neoplasms in childhood is the ovary.
3. In all the literature there are approximately only 200 ovarian tumors in children reported.
4. The diagnosis, except in the functioning tumors, is usually made accidentally.
5. Removal of the involved ovary and tube is the procedure of choice, if the other ovary appears uninvolved.
6. The prognosis, in malignant tumors in children is unfavorable.
7. In obscure abdominal complaints in children, ovarian tumors should be at least suspected.
8. A bi-manual recto-abdominal examination could well be made a part of routine examinations in children.
9. A case of ovarian carcinoma in a child is reported.

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About 78,000 babies under one month of age die in the course of a year in the United States—well over twice the number who succumb during the remaining 11 months of infancy. Life is particularly hazardous for the newborn. One third of all deaths in the first year of life happen on the day of birth; three fifths of the infant deaths occur in the first week. If the number of deaths on the day of birth were to continue for the first 100 days, no infant would survive beyond that time.—*Statistical Bulletin, Metropolitan Life Insurance Company,* February 1952.

Isolated Myocarditis in Children*

With Two Case Reports

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MYOCARDIAL disease with no obvious cause has been found to occur with moderate frequency in childhood.[1] The term, isolated myocarditis, was first introduced into the American literature by Scott and Saphir[2] in 1929, and the first case was reported in 1901. Tedeschi and Stevenson,[1] in an extremely comprehensive article, report on 64 cases recently collected from the literature as well as two of their own. Most cases occurred in the first three years of life or in the third and fourth decades.

CLASSIFICATION OF MYOCARDITIS IN CHILDREN

A classification of the myocardial diseases of childhood based on etiology seems more exact than one based on purely pathological findings. The reaction of the myocardium to injury falls within fairly narrow limits, and different stimuli may produce a myocardial lesion which is not pathognomonic. Fetal myocarditis is probably a developmental condition.[3] Other diseases of the myocardium can be separated into groups,[4] depending on their infectious, rheumatic, nonspecific, or isolated etiology (see table I).

CLINICAL SIGNS

Five cases of isolated myocarditis have been reported in which[5] an acute laryngotracheobronchitis terminated in sudden death. The usual clinical picture is that of an upper respiratory infection in which signs of myocarditis develop out of proportion to the primary disease. Tachycardia, cardiac enlargement, cyanosis, low blood pressure, EKG changes, and interstitial pneumonia manifest themselves rapidly.

PATHOLOGY

The heart[1] is usually enlarged and dilated. The endocardium and pericardium may or may not be involved. The myocardial inflammation is primarily interstitial with mononuclear infiltration between the muscle fibers. Edema, engorgement of the blood vessels, and muscle degeneration also occur.

TABLE I

CLASSIFICATION OF MYOCARDITIS IN CHILDREN

1. *Fetal*
2. *Infectious*
   - a. Diphtheria
   - b. Typhoid
   - c. Influenza
   - d. Pneumococcal
   - e. Hemolytic streptococcus
   - f. Syphilis
   - g. Tuberculosis
   - h. Polio
   - i. Focal (abscess) (Staph. - Monilia - E. Coli)
   - j. Parasitic
     - (1) Toxoplasma
     - (2) Histoplasma
     - (3) Trichina
   - k. Rickettsia (RMSF - Typhus)
   - l. Subacute bacterial endocarditis
3. *Rheumatic*
   - a. Rheumatic fever
4. *Non-specific*
   - a. Sensitization
   - b. Malnutrition
   - c. Potassium deficiency
   - d. Nephritis
   - e. Lupus erythematosus
5. *Isolated*

House[6] reported four cases of patients age three weeks to four months, in which the hearts showed areas of softening, diffuse absence of heart muscle, edema, and interstitial infiltration with lymphocytes and large mononuclears. In one case, the myocarditis was granulomatous. The hearts were all enlarged; there were no congenital abnormalities, and the coronary circulations were normal.

CASE REPORTS

Case 1. M.B. (No. A 51-24),* a four year old white boy, was admitted to the hospital on April 5, 1951. He was in good health until seven days before admission, when he developed a respiratory infection. A few days before admission, he began complaining of fatigue. Physical examination revealed an acutely ill child, with edema of the face, and signs of heart failure. The heart was considerably enlarged, and the liver palpable. There was a pneumonia at the right base. The temperature was 99.2°, rectally, pulse 90, urine normal, and white blood count 11,900. The first day after admission he began to cough and expectorate thick mucus. The second day following admission, he became more dyspneic and more edematous. On the third hospital day, he became cyanotic and expired suddenly. A blood culture was sterile, and there were no cells in the spinal fluid, which was also negative on culture.

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*We are indebted to Dr. M. M. Heffron of Bismarck, North Dakota, for his referral of this patient.

Pathological report. The body was that of a somewhat undernourished, but well developed four year old child. There was no external evidence of petechiae, ecchymoses, icterus, or generalized lymphadenopathy. The abdomen was moderately distended and the face appeared slightly puffy. A small amount of ankle edema was present bilaterally. The chest and abdomen were opened in the usual manner. The heart weighed 85 grams and the pericardial cavity was distended with a murky, straw-colored fluid. The myocardium was very flabby in consistency and there was considerable dilatation of both the right and left ventricles. The tricuspid, mitral and aortic valves were all freely movable and presented no vegetations. The coronary orifices were patent and the vessels were smooth and flexible throughout. No congenital abnormality or defect was present. The right lung weighed 160 grams and the left lung weighed 140 grams. Both pleural cavities contained several hundred cubic centimeters of murky, straw-colored fluid. The lungs were markedly congested and edematous and on section there was a considerable amount of oozing of fluid. Bronchopneumonic infiltrations were present throughout all lobes, particularly in the hypostatic area.

The spleen weighed 40 g. and was markedly congested and somewhat muddy in consistency. On section, the Malpighian corpuscles stood out clearly and abundant scrapings were yielded to the knife blade. The liver weighed 585 g. and was quite firm in consistency. There did not appear to be any increased resistance to the knife blade, but on section, the central lobular areas appeared congested. Some areas presented a suggestion of nutmegging. The biliary tree was clear and normal throughout. The pancreas and adrenals appeared to be normal. The right kidney weighed 36 g. and the left kidney 34 g. The capsules stripped easily from the surface of both kidneys and no subscapular hemorrhages were present. On section, both kidneys appeared to be markedly congested although the medullarly and cortical areas were clearly demarcated from one another. Pelves and ureters were clear and the urinary bladder was without abnormality. There was about four to five hundred cubic centimeters of murky, straw-colored fluid present in the peritoneal cavity, and the parietal peritoneum appeared to present some thickening. No signs of an acute inflammatory process were discernible. The alimentary canal appeared to be normal throughout.

Histologic examination of the myocardium showed a diffuse interstitial infiltration with lymphocytes, plasma cells, and a very few PMN's. Some areas presented considerable interstitial edema and in many areas the cardiac muscle fibers showed loss of striation and smudging of the nuclei. No complete necrosis appeared to be present, however. The above described inflammatory process was diffuse and not focal in character. All elements of the myocardium appeared to be equally involved. The pericardium and endocardium were thickened and showed subepithelial round cell infiltration.

Histologic examination of the lungs showed most of the alveolar spaces to be filled with a homogenous exudate of rather high specific gravity and the alveolar capillaries to be markedly congested. Many spaces contained numerous alveolar phagocytes and there was some tendency toward organization of the exudate into fibrin plugs. Some areas presented a focal infiltration of PMN's and round cells which were particularly prone to follow the bronchial distribution. Histologic examination of the liver showed marked congestion of the central veins and some necrosis of liver cells in the central lobular area. The portal canals were heavily infiltrated with round cells. Examination of the spleen showed the venous sinusoids to be engorged with erythrocytes. The Malpighian corpuscles were well demarcated.

Examination of the pancreas and the adrenals presented no abnormality. Examination of the kidneys showed the peritubular plexus to be markedly congested. A few of the collecting tubules contained erythrocytic casts. The glomerular capillaries appeared normal and Bowman's membrane also showed no abnormality. The proximal convoluted tubules showed small amounts of cloudy swelling. Examination of sections through all the serous membranes showed some fibrous thickening of these membranes with a mild amount of round cell infiltration.

Cause of death: Diffuse myocarditis of undetermined etiology.

Anatomical diagnosis: Diffuse myocarditis; pulmonary congestion and edema; bronchopneumonia, bilateral; pleural effusion, bilateral; pericardial effusion; ascites; chronic passive congestion of the liver and spleen.

Case 2. K. K. (No. A 51-40),* a white infant of seven months, was admitted to the hospital on April 8, 1951. He was well until one day before admission when he began vomiting and became very listless. Physical examination disclosed an acutely ill boy. He was having some respiratory difficulty. The heart seemed perfectly normal. The liver was enlarged. Temperature was 99°, rectally. Urine was normal. The day following admission, he became dyspneic and cyanotic and died suddenly. Blood culture and spinal fluid culture were both sterile.

Pathological report. The body was that of a well-developed, well-nourished male infant, seven months of age. There was a patchy cyanosis present over the abdomen, thorax, and upper arms. There was no evidence of ecchymoses, petechiae, generalized lymphadenopathy, or icterus. The extremities were without abnormality. The pleural cavity and pharynx were clear.

The chest and abdomen were opened in the usual manner. The heart weighed 90 g. and was markedly enlarged, primarily due to dilatation of all chambers. The myocardium was flabby and on section was of a deep red color. There was no evidence of congenital defect or abnormality. The aortic, tricuspid, and mitral valves were clear. No thrombi were present. Right and left lungs each weighed 70 g. Either pleural cavity contained about 25 cc. of a straw-colored fluid. The lungs were moderately congested and edematous, particularly in the dependent areas. A few minimal bronchopneumonic infiltrations were present in the lower portions of both lower lobes. Pulmonary vessels and bronchi were clear. There was no demonstrable atelectasis present.

The liver weighed 350 g. and was quite firm in consistency. On section, it appeared to be intensely congested and of a deep brownish-red color. The biliary tree was clear. The spleen weighed 25 g. and on section yielded abundant scrapings to the knife blade. No accessory spleen was present. The right kidney weighed 35 g. and the left kidney 30 g. Both kidneys showed well-developed lobulations. On section, the cortical medullary markings were quite plain, but the medullary portion appeared unusually congested. Pelves, ureters, and bladder were clear. The cranial vault was opened and the brain removed in the usual manner. The brain was put aside for sectioning at a later date. On complete serial section of the brain, however, no gross evidence of abnormality was present.

Histologic examination of the myocardium showed marked, diffuse interstitial infiltration consisting mostly of lymphocytes and a very few PMN's. The involvement extended throughout the entire myocardium. Considerable interstitial edema was also present and there were evidences of degenerative changes of the cardiac muscle fibers, represented by loss of striation and some nuclear smudging. The pericardium was also involved with a similar infiltration. Histologic examination of the lungs showed considerable congestion and edema and in a few areas, the alveolar spaces were found to contain scattered PMN's. Examination of the liver showed the central lobular vein to be congested and the sinusoids to be packed with erythrocytes. There was moderate round cell infiltration of the portal canals. Examination of the spleen showed the venous sinusoids to be packed with erythrocytes. The Malpighian corpuscles were very prominent and occasionally exhibited secondary follicles. The kidneys were congested, but otherwise did not appear remarkable. Sections from the cerebral cortex and base of the brain showed no evidence of abnormality.

Cause of death: Primary, diffuse interstitial myocarditis.

Anatomical diagnosis: Primary, diffuse interstitial myocarditis; bronchopneumonia, bilateral; pleural effusion, bilateral.

SUMMARY

Two cases of isolated myocarditis in children have been added to the literature. In both cases, death occurred suddenly, after a short illness.

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*We are indebted to Dr. Edwin Vinje of Hazen, North Dakota for his referral of this patient.

Agenesis of Anus and Rectum*

With Report of a Case

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CONGENITAL malformation of the anus and rectum is a rare condition, occurring in about one out of 5,000 births, and is found slightly more often in males than in females. Associated anomalies, ranging from fistulous communication and congenital heart disease to Meckel's diverticulum, are quite common and are encountered in 30 per cent to 60 per cent of the cases.

The sequence of events leading to such a defect is best understood when considered from a developmental viewpoint. When the embryo is three weeks old the cloaca originates from the entoderm of the blind end of the hind gut, and the proctoderm is formed from an invagination of the ectoderm. During the sixth and seventh weeks the urogenital groove is growing downward and dividing the cloacal membrane into urogenital and anal membranes. By the eighth week the urogenital membrane breaks down to establish an external opening, and the anal membrane ruptures, establishing continuity between proctoderm and anus. Any arrested development of the entodermal cloaca will result in a malformation of the rectum. If the anal membrane fails to break down, an imperforate anus will ensue. And when there is no downward growth of the urogenital groove there will be a fistulous communication.

Various types of anorectal malformation are recognized. The most logical classification is offered by Ladd and Gross as follows: Type I. Incomplete rupture of the anal membrane or stenosis at a point 1 to 4 cm. above anus; Type II. Imperforate anus, obstruction due only to persistent membrane; Type III. Imperforate anus, but with rectal pouch separated from anal membrane. Rectal pouch ends blindly either in pelvis or above the pelvis; Type IV. Anus and pouch normal. Rectal pouch ended blindly. Either membranous obstruction or separation of these two pouches. When pouches were separated, a cord of tissue occasionally connected them. Fifty to 85 per cent of the cases belongs to Type III which is by far the commonest of all anorectal malformations.

The following report illustrates a case of Type III anomaly with agenesis of anus and rectum which was treated successfully with surgery.

Case B.H. (Hospital No. 1151), a three-day-old male infant, was admitted to Pine Ridge hospital on March 18, 1951 because of the absence of bowel movement for two days since birth and generalized abdominal distention. He had been delivered at home on March 16, and found to have no anal opening the following day. The child was hospitalized and an emergency operation for imperforate anus was attempted but failed. He was referred to this hospital on his third day of life with the impression of imperforate anus and recto-vesicular fistula.

Physical examination revealed a well developed, well nourished newborn male infant who was markedly dehydrated and in acute distress. The tongue was moderately coated. Abdomen showed generalized distention, and there was a recent surgical incision in the anal region. The cries were feeble and the color was poor. An x-ray flat plate of the abdomen in the inverted position (figure 1) following the technique of Wangensteen and Rice disclosed a gaseous distention of the bowels. The rectum could not be visualized, and the large intestine appeared to end blindly high up in the pelvis. The urine was clear and contained no meconium. The use of Levine tube with Wangensteen suction was instituted immediately, and 250 cc. Amigen in Ringer lactate solution was administered subcutaneously. Gastric suction and subcutaneous fluid was continued the next day. The urine was still clear. The intestines were considerably decompressed, but the general condition remained poor. A clinical diagnosis of agenesis of anus and rectum was made finally.

On his fifth day of life, March 20, the child was operated on for the second time. A left para-rectus incision was made under local infiltration of one per cent procaine with hyaluronidase. The bowels were so distended that decompression was decided upon immediately and carried out by inserting a small suction tip into a stab wound made in the descending colon. It was then found that the rectal pouch was arrested at the level of the anterior superior iliac spines. There was no communication or fibrous connection leading to the anus. No fistulous tract was apparent. The bowels were otherwise normal except for a Meckel's diverticulum measuring about one cubic centimeter in the mid portion of the ileum. The blind end of the bowel was mobilized as much as possible, and the abdominal wound was temporarily closed. With the patient in a lithotomy position the perineal incision of three days previously was reopened and extended toward the coccyx under the same local anesthesia. The abdominal wound was reopened. With the little finger of the left hand pushing

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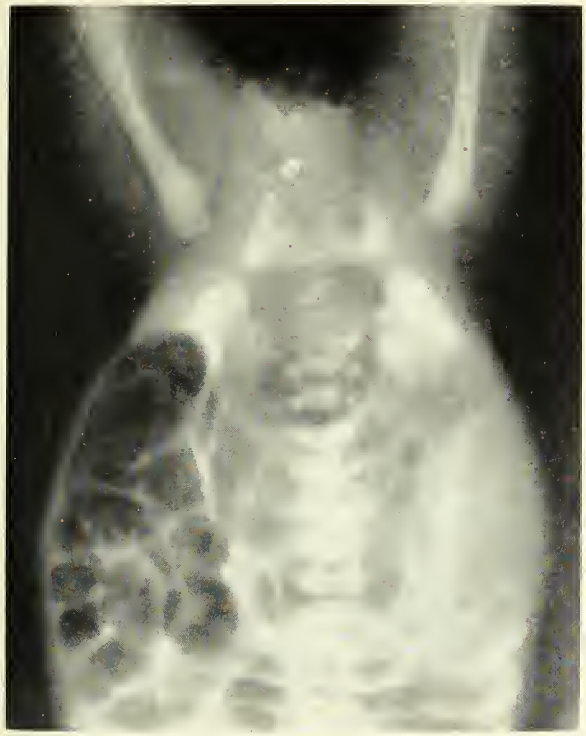

Fig. 1. X-ray appearance of gas filled bowels in inverted position.

up through the perineal wound the pelvic peritoneum was incised and through that opening the mobilized rectal pouch was delivered to the perineum. This was accomplished by inserting a Babcock forceps through the perineal incision into the pelvic abdomen and gently pulling the rectal pouch down to the perineum. The periphery of the rectal pouch was anchored to the perianal skin by interrupted fine chromic catgut sutures. Both ends of the perineal incision were approximated by similar sutures. A stab wound was then made into the blind end of the bowel and a rubber tubing inserted into it for an estimated distance of five centimeters. The rubber tubing was fastened to the new anus by chromic catgut sutures. Passage of gas and meconium was immediately evident. The abdominal wound was closed with a single layer of continuous silk suture.

The immediate postoperative condition was satisfactory. Gastric suction was discontinued. Two hundred fifty cubic centimeters of Amigen in Ringer lactate solution was administered subcutaneously for two days. Five milligrams of vitamin K was given for three days. Oxygen was administered, and hot water bottles applied. Multiple vitamins, penicillin and streptomycin were given prophylactically. Oral feeding was started on the second postoperative day with formula of half an ounce every two hours and gradually increased in amount and prolonged in interval to four ounces every four hours. The rectal tube was spontaneously expelled on the sixth day. Perineal care was given on the seventh day after spontaneous bowel movements. On the eighth day the body weight was 6 lbs. 6 oz., and the color of the stools was noted as normal for the first time. The abdominal suture was removed on the eleventh day, and the wound was clean and healing well. On the twelfth day the buttocks were found to be excoriated, and bland ointment was applied. The stool was first found to be normal in both color and consistency on the fifteenth day. There were three bowel movements on the same day, and it was assumed that sphincter control was present at least in some degree. Between the twenty-sixth and twenty-eighth day there was a bout of diarrhea which cleared up rapidly with the administration of sulfonamides. On the thirtieth postoperative day the patient weighed 7 lbs. 6½ oz. as compared with 6 lbs. 6 oz. three weeks previously, had one normal bowel movement and was discharged from the hospital. His bowel movements have since been regular and normal, and there is no apparent impairment of sphincter control as of March 1952, one year after surgery.

DISCUSSION

The operative approach always offers a problem in surgery for congenital anomalies of the anus and rectum. A perineal operation is successful in most instances, but there are other more serious ones in which a decision between a colostomy and an abdominal operation must be made. In a series of 117 cases of Type III congenital malformation reported by Ladd and Gross perineal operation was performed in 99 with success in 85, and colostomy was performed in the remaining 14. Other authors also recommend colostomy in cases where the rectal pouch is too high up to be successfully brought down through the perineal approach and where the intestinal obstruction is so marked that decompression becomes the immediate consideration. It must be pointed out, however, that colostomy is, in general, poorly tolerated by the newborn, and it is perhaps justified only as a last resort and in cases of an associated fistulous communication where extensive surgery cannot be performed at the moment. On the other hand, it is felt that a one stage abdominal and perineal operation is a logical approach and should be attempted.

SUMMARY

1. The literature on congenital malformation of the anus and rectum is briefly reviewed.

2. A case of agenesis of anus and rectum successfully operated on is presented.

3. It is felt that for congenital anomalies of the anus and rectum where perineal operation fails and where there is no fistulous communication a one stage abdominal and perineal operation is a logical approach and should be attempted.

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(Continued on page 271)

Hydranencephaly*

Report of a Case

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Hydranencephaly is a congenital anomaly in which the cerebral hemispheres are absent as such, although vestigial fragments of these structures may be present. The cranium and the meninges are present and enclose cerebrospinal fluid replacing the cerebral hemispheres, with variable degrees of head enlargement. There may be defects or absence of the olfactory and optic tracts. The pons, cerebellum and medulla are usually normal.

Johnson, Warner and Simmonds[1] reported two cases of hydranencephaly diagnosed at the Children's Memorial Hospital of Chicago between 1944 and 1947, and reviewed a total of fourteen other cases in the literature reported between 1856 and 1944. However, apparently they did not have available the report of Hamby, Krauss and Beswick[2] of seven cases of hydranencephaly proved at operation or autopsy at the Buffalo Children's Hospital in a period of only two years. These authors suggested that hydranencephaly is a more frequent anomaly than previously thought and emphasized the clinical diagnosis of this condition. They stressed the importance of making the diagnosis as early as possible for prognostic purposes, and listed the diagnostic points under the following headings:

1. Evidence of retardation, usually recognizable after the first week of life.
2. Enlargement of the head.
3. Hyperirritability.
4. Eye findings, such as strabismus, nystagmus and pallor of optic discs.
5. Convulsive activity, usually manifested by rigidity.
6. Tympanitic note on percussion of the skull.
7. Absence of electroencephalographic waves, except over the vestigial areas of cerebral hemispheres.
8. Translucence of the head on transillumination. Light may be seen shining through the pupils also.
9. Cerebrospinal fluid obtained very near the surface of cranium on subdural puncture.
10. Absence of cerebral hemispheres on ventriculography.

The following case which showed most of the above diagnostic signs is reported:

K. J., a male, and the third child of healthy parents, was born at St. John's Hospital at full term after a normal delivery on November 29, 1950. The birth weight was 4820 grams, the length 54.5 cm. and the head circumference 38.1 cm. The baby was considered to be normal on physical examination and was discharged on the third day. His temperature during the three day hospital stay varied between 97° and 98° F.

The baby was admitted to hospital on January 2, 1951, at the age of five weeks because of irritability, anorexia and apparent pain of three days' duration. The mother had noticed enlargement of the head for only two days prior to admission. The admission temperature was 101° F., the weight 5580 gm. and the head circumference 43.7 cm. The principal physical findings were the enlarged head, separation of suture lines, enlarged, tense fontanels, strabismus, grayish color and apparent failure to respond to light or sound. After twenty-four hours, the temperature was normal, but after this was usually subnormal.

The laboratory work showed a slight degree of anemia, a white count of 17,500 and a normal urinalysis. The spinal fluid on admission was clear and colorless with no cells and a total protein of 78 mg. per cent.

Routine x-rays of the skull showed widely open fontanels, widened sutures and enlargement of the head suggestive of hydrocephalus.

On January 4, 1951, transillumination of the head showed the translucence seen in case of hydranencephaly and a presumptive diagnosis of this condition was made. Bilateral subdural taps yielded clear fluid under great pressure at a depth no greater than three-eighths inch. Air encephalogram confirmed the diagnosis of absence of the cerebral hemispheres.

The course in hospital was steadily downhill until death on January 25, 1951, at the age of 57 days. This period was characterized by subnormal temperature, steady loss of weight, extreme difficulty of feeding and projectile vomiting. The baby had a continuous staring, inert expression with open eyes even in sleep. He was markedly rigid, but there were no convulsions.

Autopsy was done by Dr. Jack Spier. The viscera showed general congestion and a duodenal ulcer, but the principal findings were confined to the head, as follows:

"The head is markedly enlarged; the anterior fontanel measures 12 by 7 cm. When the skull is opened, a paper thin membrane forming an intracranial sac is found connected by the usual falx and tentorium. The sac contains 1500 cc. of fluid which is watery clear and straw colored.

"Upon removal of the fluid, two flat portions of brain tissue are seen at the base of the sac. They measure

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*From the Dakota Clinic, Fargo, North Dakota.

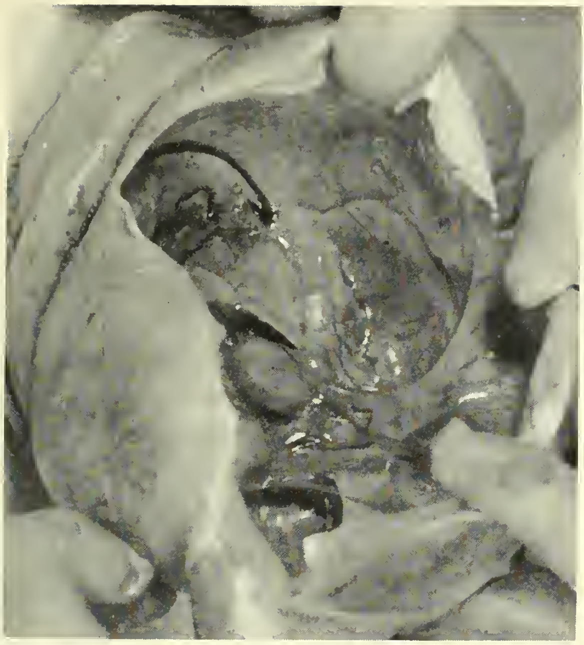

Fig. 1. The cranial cavity at autopsy showing absence of cerebral hemispheres as such.

7x6x2 cm. and 7x3½x2 cm. These are hollow structures with grooves between the upper and lower flaps resembling the lateral ventricles. The two flat portions of brain tissue are loosely connected with each other by a thin membrane which can be easily separated. From each of these hollow structures, ridges of brain tissue about 4 cm. long and quite flat connect with the cerebellum. A few elevations are seen under the pulvinar which might constitute the quadrigeminate bodies. The aqueduct cannot be found. The optic, oculomotor and olfactory tracts are present. The trochlear, trigeminal, abducens, facial and glossopalatine nerves are the only other structures which can be identified. The cerebellum and the medulla are grossly not unusual."

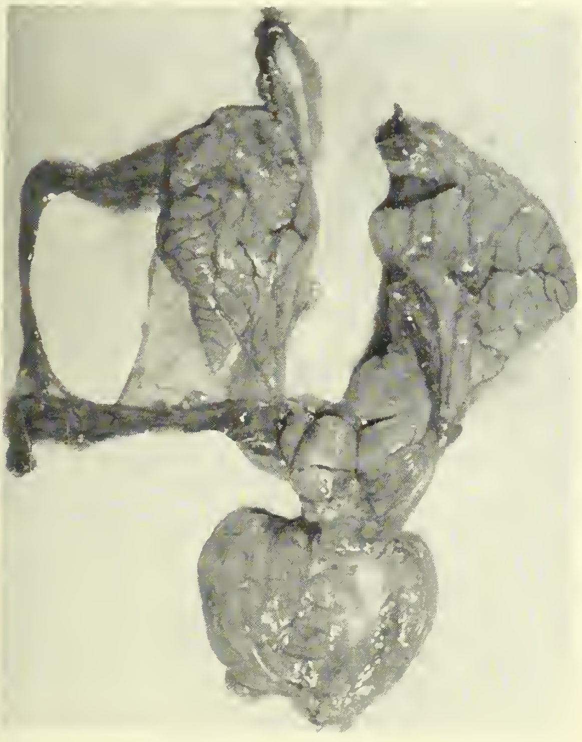

Fig. 2. The brain removed in its entirety, showing vestigial portions of the cerebral hemispheres.

"Microscopic sections through the flat portions of the brain which were the remnants of the hemispheres show a diminution of cellular elements; the pyramidal, granular, fusiform cells, horizontal cells of Cajal and the cells of Martinotti are identified in reduced numbers. The nerve cells and neuroglia show degenerative changes as evidenced by vacuolization of their cytoplasm and pyknosis of the nuclei. No areas of encephalomalacia are found. Myelinated nerve fibers are recognized also in these sections. The meninges are somewhat thickened and show vascularity. The choroid plexus shows no histological abnormalities. The optic, oculomotor and olfactory tracts on section are histologically normal.

"Sections of the elevations described grossly as lying under the pulvinar are histologically compatible with hypoplastic quadrigeminate bodies.

"The cerebellum and pons microscopically show only a mild degree of hypoplasia."

DISCUSSION

Hydranencephaly is compatible with life. One of Hamby's patients lived for twenty-six months and he refers to a patient reported to have lived three and a half years.

The anomaly is not so rare a condition as the small number of early reports would seem to indicate. Recently the number of reported cases has increased markedly, probably because of better diagnostic methods.

Recognition of the anomaly at an early age is of great importance to differentiate these cases from the usual hydrocephalics. Not only will recognition aid the pediatrician in prognosis, but also in selecting proper cases of hydrocephalus which might be amenable to the newer surgical procedures to divert the cerebrospinal fluid.

The diagnosis can be proved with a minimum of special equipment and suspected strongly by anyone who will make transillumination of the head of all hydrocephalic or retarded infants a regular part of the physical examination.

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Observations on Two Children with Diabetes Mellitus and Epilepsy

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EPILEPSY in a diabetic child can result from brain damage subsequent to prolonged hypoglycemia. Case reports on two such patients and the clinical and laboratory findings will be presented.

"Profile studies" on the labile diabetic with epilepsy may yield insight into the biochemical mechanisms which render his control so difficult. Furthermore, such mechanisms could be involved in "precipitating" seizures. The quantitative 24-hour variations in two indices of carbohydrate metabolism and in an index of excessive neuronal discharge within the central nervous system will therefore be evaluated.

CASE REPORTS

Case 1, an obese yet alert, 5 year old boy, was admitted to the Pediatric Service of the University of Minnesota Hospitals (No. 833141) in June 1951. His balance was poor; he had to be continuously supported while sitting. He answered questions and followed directions normally for his age. His height was 101 cm.; weight, 20.6 kg.; temperature, 100° F.; pulse rate, 90/min.; respiration, 20/min.; blood pressure, 90/60 mm. Hg.; his tonsils were injected. Neurological examination revealed a moderate paresis of his left arm and leg, and a left sided facial paresis. Hyperactive reflexes on the left side of his body were noted. Babinski's sign was bilaterally positive.

Suddenly, during the physical examination, his eyes rolled, his left arm started twitching and he threw himself forward. After about 30 seconds of unconsciousness, he began to cry. Additional episodes, consisting of several petit-mal like spells and of a major seizure, associated with generalized twitching of all extremities, were also noted during this physical examination.

A blood sugar value of 700 mg. per cent was obtained on admission; the plasma CO_2 combining power was 18 mEq. and chloride was 93 mEq. per liter. His urine showed: sp. gr. 1.032, pH 6, sugar (4+), a trace of acetone; an occasional white cell but neither red cells nor albumin. Blood examination revealed: hemoglobin, 12.2 g./100 ml.; leukocytes, 4,900 per cm. with P.M.N., 52 per cent; lymphocytes, 41 per cent; monocytes, 4 per cent; eosinophiles, 3 per cent. Mantoux, blood Wassermann and dye test for toxoplasma antibodies, negative. A roentgenogram of his skull revealed no calcifications or other pathological finding.

An electroencephalogram, obtained during sleep, showed almost complete suppression of normal activity on the right side; it is strongly suggestive of organic brain damage and convulsive disorder (figure 1).

Past history. No family history of diabetes or epilepsy. There was polydipsia at 18 months of age. Diagnosis of diabetes was made and treatment was initiated at that time. One year later he developed pneumonia. Recovery was uneventful. Control of diabetes was qual-

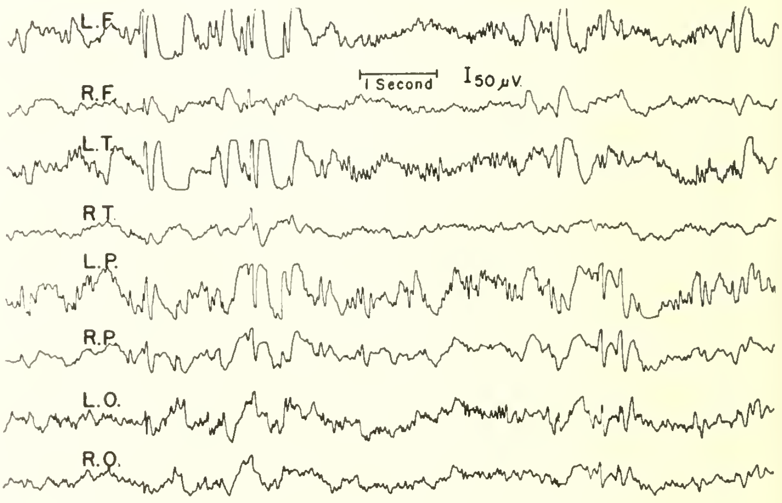

Fig. 1. *Case 1.* E.E.G. Monopolar technique. Record taken under seconal sedation. Frequent bursts of high voltage spikes, followed by slow waves in the left frontal, temporal and parietal areas. The normal sleep spindles are absent over the right hemisphere. Random spikes occur over all areas.

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*Read at the autumn meeting of the Northwest Pediatric Society, Bayport, Minnesota, September 28, 1951.
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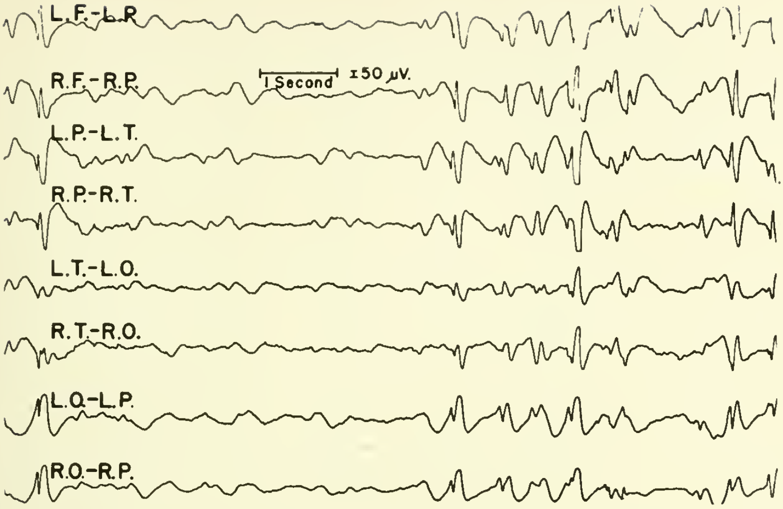

Fig. 2. *Case* 2. E.E.G. Bipolar technique. Blood sugar at the time of recording: 90 mg. per cent. Paroxysmal outbursts of 2½ per second spike-dome discharge; equally over both hemispheres.

ified as fair during the following years. Only mild glycosuria occurred on a dosage of 10 units of regular insulin and 7 units of protamine zinc insulin. Growth was satisfactory. On December 1950, 12 hours after he had broken diet by eating about a pound of candy, he became "groggy." His parents treated him with 10 units of insulin at two-hour intervals. Following injections totaling 50 units of insulin, the patient was hospitalized in a comatose state. Blood sugar was 34 mg. per cent. Although the blood sugar was restored to the normal by glucose administration, he remained comatose for seven days. During this period his left arm and left leg twitched almost constantly. From this episode he sustained a residual left hemiparesis. While use of the arm and leg was gradually regained, both left extremities remained weaker than the right.

About six weeks after this episode, the patient began to have occasional "spells" in which he would fall forward, with his eyes turned up. Some of the spells lasted but a few seconds. Some of long duration were also noted. These were characterized by a grimaced face, generalized twitching and unconsciousness for 10 to 15 seconds. Convulsions of severe grand mal type occasionally occurred.

Fifteen units of regular and 15 of protamine zinc insulin were injected daily at breakfast time, for management of the patient's diabetes until his admission to the hospital.

Case 2, a 7 year old boy, was admitted to the Pediatric Service of the University of Minnesota Hospitals (No. 814827) in February 1950. Height was 118 cm.; weight, 24.5 kg.; temperature, 99.8° F.; pulse rate, 118/min.; respiration, 22/min.; blood pressure, 112/95 mm. Hg. The liver was palpable 7 cm. below the right costal margin. Reflexes were somewhat sluggish, equal bilaterally. A roentgenogram of the skull was negative. Wassermann and toxoplasmosis tests were negative.

Blood sugar on admission was 640 mg. per cent; CO_2 combining power 19 mEq. and chloride 103 mEq./liter. Glycosuria was 4+ with traces of acetone. Hemoglobin was 12.4 gm. per cent; W.B.C., 5600; P.M.N. 72 per cent; lymphocytes, 25 per cent; monocytes, 3 per cent; eosinophils, 0; basophils, 0.

An electroencephalogram revealed paroxysmal bursts of high voltage 2 to 3 per second, irregular slow waves, preceded by single or multiple spikes, over both hemispheres. The basic occipital frequency was 7 per second (figure 2).

The patient presented a behavior problem. Testing on a Stanford-Binet intelligence scale, Form M, showed his mental age to be 4 years and 11 months, with an I.Q. of 69. Spottiness of performance was noted in additional tests of intelligence and was interpreted as being suggestive of organic brain damage.

Seizures were noted frequently during the patient's stay at the hospital.

Past history. The patient came from a broken home. His father was a diabetic, but there was no family history of epilepsy. Nothing abnormal was known about the patient's birth and early childhood. He walked and talked when 2 years of age. Diabetes was detected at the age of 2½ years. At that time he was in the custody of his mother and his treatment was described by a social worker as "sporadic and inconsistent." At the age of 4 years his father and an energetic grandmother were placed in charge of the boy. Insulin treatment was given thereafter.

During the patient's fifth year he was treated with zinc protamine insulin for three months. In the course of that period he had four or five episodes of prolonged unconsciousness, reportedly "of less than eight hour duration." The onset of petit mal attacks dates back to this period. Protamine zinc insulin was discontinued; seizures, however, continued to occur and were noted at first in the morning only. Subsequently they occurred at any time of the day and bore no relationship to meals. He injured himself on so many occasions during seizures that he was obliged to leave school.

Comment. Permanent brain damage is probably the basis of the convulsive disorder in these two diabetics with epilepsy. The diagnosis of gross brain damage is substantiated by the neurological and electroencephalographic findings for Case 1. The presence of brain damage in Case 2 is suggested by the results of psychological testing and possibly by the electroencephalogram. A history of coma for seven days, subsequent to excessive insulin administration, justifies the assumption that the brain was injured

TABLE I

VARIATIONS IN BLOOD SUGAR OF CASE 1, ON DAYS WITH AND WITHOUT SEIZURES

Date	*Clock Hour*	*Blood Sugar*	*Comment*	*Date*	*Clock Hour*	*Blood Sugar*	*Comment*
July 25, 1951	07:30	600		Aug. 14, 1951	07:30	336	
	09:00	→	Petit mal		11:00	318	
	12:00	195			11:30	→	Petit mal
	13:00	37			16:00	518 →	3x Petit mal
	19:30	56			20:00	478	
July 27, 1951 No fits	01:30	218		Aug. 15, 1952 No fits	07:30	65	
	07:30	450			11:00	120	
	13:30	41			16:00	276	
	19:30	244			19:00	436	
July 30, 1951 No fits	01:30	41		Aug. 16, 1952	06:00	→	Petit mal
	07:30	171			07:00	262	
	13:30	53			11:00	115	
	19:30	84			16:00	262	
					21:00	390	

by prolonged insulin-hypoglycemia in Case 1. The onset of the first epileptic episodes during a period when the patient was reported unconscious subsequent to a change in his insulin medication is suggestive of a brain injury during hypoglycemia in Case 2.

The lack of data on the blood sugar levels in Case 2 at the crucial times of the "insulin reaction," is unfortunate. With regard to Case 1, it is noted that the patient, when described as "groggy," could have had either hyperglycemia or hypoglycemia. The latter possibility has to be considered in view of the extreme variations in blood sugar levels over a few hours as emphasized in the subsequent profile studies (for Case 1 in Table I, and for Case 2 in Table II). It should be further noted that a birth injury is very unlikely to have occurred in these two cases. Neither of these patients with diabetes and epilepsy is known to have a family history of epilepsy. Furthermore, electroencephalographic tracings, obtained on both parents and two brothers of the first patient were entirely normal. Thus, the data in hand for evaluation of the cause of the convulsive disorder in these two patients are consistent with the diagnosis of epilepsy, subsequent to brain damage by "insulin-induced" prolonged hypoglycemia with convulsions.

Similar observations have been reported by others.[1,2,3] The term "hyperinsulinism" has been proposed to include the state produced by excessive amounts of insulin in the body "regardless of whether the insulin is exogenous or endogenous in origin."[4] Gardner and Reyersbach[5] recently described brain damage during insulin hypoglycemia in a diabetic child, who eventually was admitted to a state hospital as a deteriorated epileptic and died there.

The morphological aspects of hypoglycemic encephalopathy are presented and discussed by Hoepker.[6] Cerebral hemorrhages, petechiae, areas of demyelination, encephalomalacia and glial reactions were the most striking findings in post-hypoglycemic encephalopathy reported by Baker and associates.[7,8]

Hemorrhages can occur in the lungs[9] and in other organs in association with hypoglycemia. Experimental animals subjected to prolonged insulin hypoglycemic shock and convulsions show petechial hemorrhages in the brain as well as in other viscera.[10] The damage to the brain is one of the more impressive sequelae of insulin induced hypoglycemia, as exemplified by the two cases presented in this paper. It leaves the physician confronted with manifold problems: the exigencies of the management of diabetes and of epilepsy and of the associated emotional and mental states.

In view of the failure of more conservative dietary regimens previously prescribed for home use, both patients were discharged from the University Hospitals on a "free" diabetic diet: For Case 1 insulin was prescribed in doses of 25 units of protamine zinc insulin and 5 units of regular insulin once daily in the morning. Case 2 required 40 units of protamine zinc insulin in the morning and 10 units of regular insulin at lunch and at supper time. The anticonvulsant medication prescribed on discharge for Case 1 was a combination of Mebaral, Mesantoin, and Tridione and for Case 2 a combination of Mebaral, Dilantin, and Tridione. Like Gardner's patient, Case 2 was committed to an institution. In 1951 this patient had 751 seizures, petit mal as well as grand mal being counted. In 1952 the frequency of his seizures decreased materially. He has gained weight satisfactorily. However, with accidental upper respiratory infections, he has experienced acidotic coma in three instances, and has had hypoglycemic episodes at other times.

During periods of acidotic coma with hyperventilation of the Kussmaul type, this patient's electroencephalogram revealed high voltage spikes and double spikes with two per second slow waves continuously throughout a tracing of 16 minute duration (figure 3). Subsequently in hypoglycemia (blood sugar 27.5 mg. per cent), a general depression of the electrical activity was noted with few high voltage slow waves. After administration of glucose, an almost normal six-per-second basic occipital frequency was seen.

After the foregoing emphasis on the necessity to prevent "insulin reactions," the analysis of certain biochemical and electroencephalographic data from these two cases is presented.

ANALYSIS OF BIOCHEMICAL AND ELECTROENCEPHALOGRAPHIC DATA

Methods. Electroencephalographic tracings were obtained with an 8 channel Grass instrument. The number of circulating eosinophils was determined by the direct chamber method. Blood sugar determinations were made by the method of Somogyi and Nelson.[11]

For Case 2 several 24-hour studies were carried out on all of these variables. The schedule followed by this patient provided 16 sessions

TABLE II

Twenty-four Hour Variations in Blood Sugar and Eosinophil Levels and in the Amount of Electroencephalographic Paroxysmal Discharge

Time of Day	*State**	*Blood Sugar (Mg. Pct.)*	*Eosinophils per Cu. mm.*	*Time† (Pct.)*	*Time of Day*	*State**	*Blood Sugar (Mg. Pct.)*	*Eosinophils per Cu. mm.*	*Time† (Pct.)*
May 28 to May 29, 1951					September 25, 1951				
00:30	S	49.5	275	41	00:30	W		193	0
02:00	S	32.5	775	34	02:00	W		88	0
03:30	S	25.0	256	32	03:30	S		72	28.1
05:00	W	31.5	191	46	05:00	S		168	15.8
06:30	S	40.0	125	33	06:30	S		75	23.3
08:00	S	70.0	59	29	08:00	W		58	0
09:30	S	59.5	119	44	09:30	W		52	0
11:00	S	35.0	297	33	11:00	W		71	2.3
12:30	W	207.5	350	65	12:30	W		61	0
14:00	W	378.0	131	71	14:00	W		90	0
15:30	W	422.0	272	75	15:30	S		69	30.4
17:00	W	430.0	47	62	17:00	W	165.0	100	0
18:30‡	W	238.0	256	51	18:30	W	335.0	109	0
20:00	W	244.8	216	57	20:00	W	335.0	39	1.7
21:30	W	168.5	338	47	21:30	W	343.0	72	0
23:00	W	106.0	400	50	23:00	S	230.0	72	0
August 14, 1951					January 9, 1952				
00:30	D	102.5	281	44.4	00:30	W	70.0	172	47.9
02:00	S	52.5	412	45.4	02:00	D	81.0	164	56.4
03:30	S	37.5	181	41.5	03:30	S	75.5	115	51.2
05:00	S	22.5	325	53.5	05:00	S	62.5	114	38.8
06:30	S	23.5	175	44.8	06:30	S	77.5	81	33.0
08:00	W	246.0	94	31.0	08:00	W	262.5	161	52.9
09:30	W	292.5	119	41.3	09:30	W	352.8	73	57.5
11:00	W	200.0	112	65.2	11:00	W	319.0	55	69.3
12:30	W	283.5	94	38.5	12:30	W	488.3	89	60.6
14:00	S	283.5	219	88.7	14:00	W	375.6	78	50.3
15:30	W	227.5	256	54.4	15:30	W	319.0	2	55.7
17:00	W	305.0	487	39.2	17:00	W	386.4	12	55.1
18:30	W	286.0	181	32.1	18:30	W	324.0	22	50.5
20:00	W	190.0	369	38.3	20:00	W	239.0	0	58.3
21:30	W	156.0	175	36.5	21:30	S	271.0	2	94.6
23:00	W	95.0	462	45.0	23:00	W	464.8	17	51.1

*State of Waking (W) of Sleep (S) of Drowsiness (D)

†Time (Pct.)—Duration of paroxysmal discharge in a 4-minute electroencephalogram, expressed as per cent thereof.

‡The investigations commenced at 18:30 on May 28, 1951.

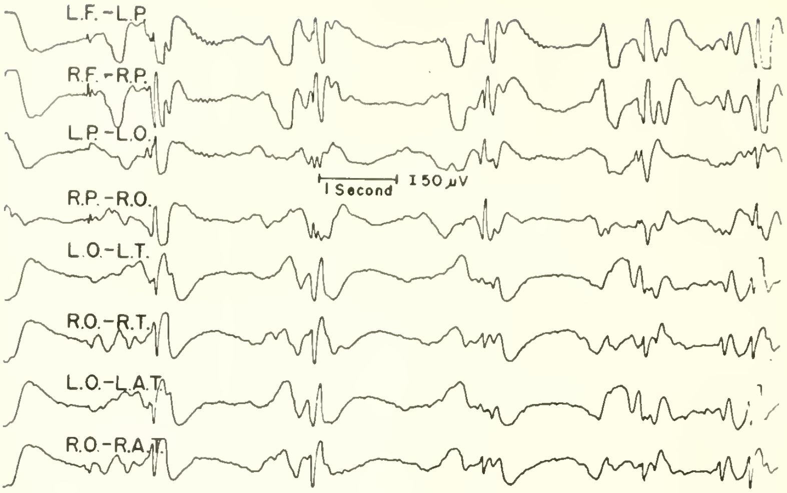

Fig. 3. *Case* 2. E.E.G. Bipolar technique. Record taken during acidotic coma with Kussmaul type of breathing. Single and multiple high voltage spikes occur rhythmically 32 to 35 times per minute. The intervals are silent or filled with irregular slow waves. No significant difference between the hemispheres.

of investigation at 90-minute intervals over several 24-hour periods. The patient was brought into the room chosen for study on the evening prior to the day of investigation. Electrodes were fastened at that time. Bipolar leads were employed. Observations started at 00:30 (with one exception, see Table I). An electroencephalographic tracing of four minute duration was obtained first. Upon its completion, capillary blood was obtained for the eosinophil counts and for the blood sugar determinations.

The amount of paroxysmal discharge in each four-minute tracing was measured and expressed as per cent time of the total time of recording. The "relative paroxysmal discharge" was computed by obtaining the average per cent time of paroxysmal discharge from the 16 figures available for each of the 24-hour periods of investigation and by expressing the per cent time of paroxysmal discharge as per cent of that 24-hour average. Likewise, in addition to the absolute values for numbers of eosinophils and for blood sugar levels (expressed as numbers per cu. mm. and as mg. per cent, respectively), the "relative" eosinophil and blood sugar levels for the 24-hour period of investigation were also computed. Conversion into relative levels yields data for attempts to correlate "within day" changes in several variables.

RESULTS

Table I presents the blood sugar values obtained on Case 1 on days with and days without seizures. It is apparent that the fluctuations in blood sugar levels are considerable on all days when several values are available for comparison. Additional blood sugar values on Case 1 are graphed in figure 4. More complete data are available on Case 2. The results of four 24-hour studies are presented in Table II and show a considerable variability of the indices quantitated in this study. Table III presents an additional profile study of eosinophil and blood sugar variations on Case 2. All of the data presented in this paper were obtained without changes in either the medication or the diet.*

a. *The blood sugar level at the time of seizures.*

It can be seen from figure 4 that the majority of the blood sugar levels which are available at three hours prior to, or subsequent to the times of occurrence of petit mal in Case 2, are either slightly or very markedly hyperglycemic. One blood sugar level which was markedly hypoglycemic was observed four hours after the occurrence of the petit mal in Case 1 (not graphed). Only six petit mals spaced more than one hour either before or after a seizure are within the normal range in Case 1. The spread of blood sugar levels into the hyperglycemic range at or around the time of occurrence of petit mal attacks in Case 1 is impressive. This was to be

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*An attempt to keep case 2 off insulin, at a time when the patient appeared to be relatively "controlled," resulted in acidosis within several hours.

TABLE III

Eosinophils and Blood Sugar Values in a Profile Study on February 2, 1952, on Case 2

Time of Day	*00:30*	*02:00*	*03:30*	*05:00*	*06:30*	*08:00*	*09:30*	*11:00*	*12:30*	*14:00*
Blood sugar (mg. per cent)	315	360	465	440	440	630	590	500	455	410
Eosinophils/cu. mm.	51	48	72	83	83	90	40	42	134	134

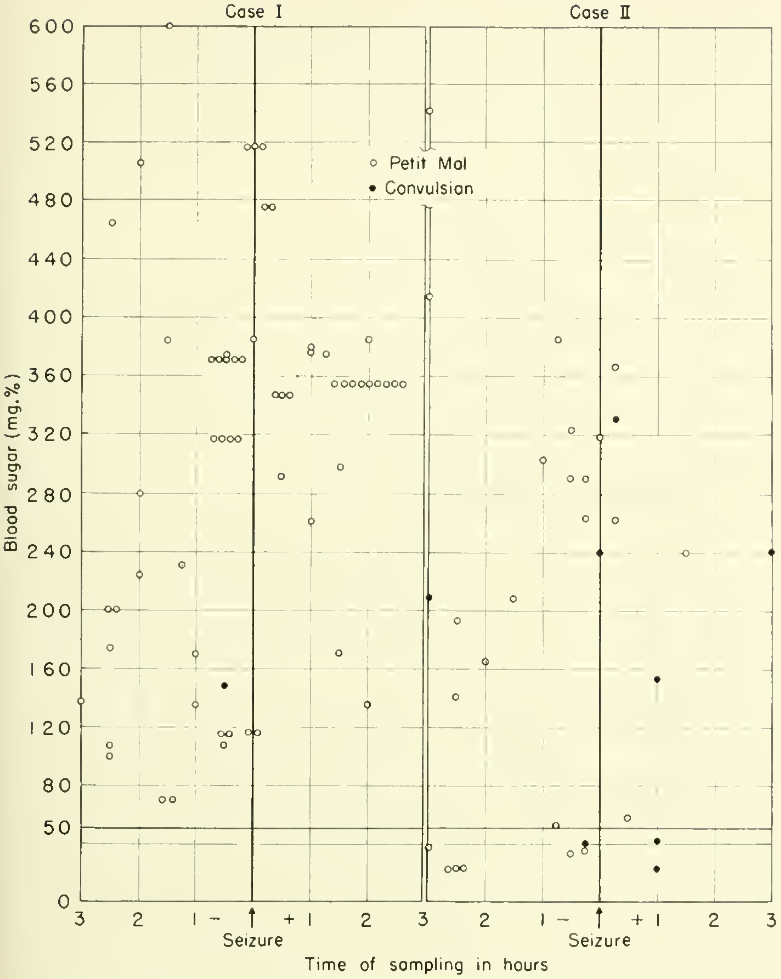

Fig. 4. Blood sugar levels at or around the time of seizures in two diabetic children with epilepsy.

expected in view of the fact that this patient was hyperglycemic most of the time. It is apparent from Table I that only three out of a total of 24 blood sugar values were markedly hypoglycemic. Additional blood sugar determinations (not tabulated) revealed that only 10 out of 115 blood sugar values obtained on Case 1 were hypoglycemic.

The blood sugar levels at, or around, the time of occurrence of seizures in Case 2 are graphed in Section 2 of Figure 4. Very few of the seizures in these patients were noted during periods of hypoglycemia. Therefore, seizures should not be attributed to insulin induced hypoglycemia whenever they occur in diabetic patients.

Comment. The observations on these two cases indicate that, whereas hypoglycemia subsequent to insulin administration may give rise to epilepsy by brain damage, the mechanism which induces seizures in such a damaged brain is dependent upon neither hypoglycemia nor hyperglycemia. Likewise, in epileptics without diabetes, the extensive investigations of Lennox,[12] as well as subsequent studies by others,[13,14] all failed to yield evidence for the assumption that an abnormality in carbohydrate metabolism might in itself induce seizures. It can be seen from Table 1 that hyperglycemic levels were found in Case 1 on days when clinical seizures were not noted. On such occasions the variations of the patient's blood sugar were comparable in amplitude to the changes in blood sugar values observed on days with clinical petit mal. However, only four determinations per day were made on Case 1. More complete data on the blood sugar levels at the tim eof seizures are available on Case 2 (Tables II and III). On February 27, 1952, when a profile study revealed consistently high blood sugar levels over a period of 12 hours, no seizure was noted. The patient had been under continuous observation during that period.

b. *The relationship between paroxysmal discharge and blood sugar levels.*

Table IV summarizes the data obtained during 24-hour studies on Case 2. It will be noted that the amount of paroxysmal discharge in this patient was significantly increased during marked hyperglycemia. Eleven out of twelve blood sugar values over 300 mg. per cent were associated with a paroxysmal discharge which covered more than one half of the record. Conversely, the amount of paroxysmal discharge exceeded 50 per cent of the time of recording only once when the blood sugar was hypoglycemic.

It should be remembered that Gibbs, Williams and Gibbs[15] observed that low blood sugar fails to influence the electroencephalogram until values of 30 mg. per cent were reached. At this level they noted a sudden shift toward the slow side, with an apparent decrease in the total amount of energy. On the other hand, at a blood sugar level of 500 mg. per cent they found an abrupt shift toward the fast side, with

TABLE IV

Per Cent Time of Paroxysmal Discharge (P.D.) in the Total (4') Electroencephalographic Tracing in Different Blood Sugar Ranges in Case 2

Blood Sugar (Mg. Pct.)	*Number of Simultaneous Determinations*	*P.D. (a)[*] Per Cent*	*P.D. (b)[†] Per Cent*
< 50	8	13	13
50–120	12	25	17
120–300	16	56	50
> 300	12	92	67

[*] P.D. exceeding 50 per cent of record.

[†] P.D. equal to or above its 24-hour mean.

an apparent increase in the total amount of energy.

In the 24-hour studies on Case 2, with a 2½ per second wave and spike, a marked decrease in the amount of pathology was observed at blood sugar values below 50 mg. per cent. This is of additional interest in view of another report on 10 patients, dealing with the 2 per second wave and spike.[16] In none of these patients was the abnormal activity significantly increased during hypoglycemia. For Case 2 this statement can be qualified to the effect that there was less abnormal activity during hypoglycemia than during hyperglycemia.[*]

Data on the 24-hour variations in numbers of eosinophils in Case 2 are included, though they are part of an independent investigation. It may be pointed out that the majority of the eosinophil levels obtained at low blood sugar values were above 140 cells/cu. mm. Conversely, relatively few eosinophils were found at blood sugar values higher than 300 mg. per cent. Both observations are suggestive of a participation of adrenal glucocorticoids in the production of hyperglycemia in Case 2. A relationship between eosinopenia and marked hyperglycemia is apparent in Table V.

TABLE V

Relationship Between Eosinopenia and Marked Hyperglycemia in Case 2

Blood Sugar (Mg. Pct.)	*Number of Simultaneous Determinations*	*< 140 Eosinophils per cu. mm. of Blood*	
		No. of Cases	*Per Cent*
< 50	8	1	13
50–120	12	5	42
120–300	18	9	50
> 300	25	23	92

SUMMARY

Case reports on two children with the clinical syndrome of diabetes and epilepsy are presented. Certain practical and fundamental aspects of the state after hypoglycemic brain damage are considered. In diabetics with epilepsy: (a) The assumption that all seizures result from insulin induced hypoglycemia is unwarranted. Genuine epileptic seizures are infrequently associated with hypoglycemia in these patients, who have apparently developed a chronic convulsive state as a result of permanent brain damage. (b) Neither hypoglycemia nor hyperglycemia, *per se*, is correlated with most of their seizures.

Twenty-four-hour investigations in a child with diabetes and epilepsy revealed that:

1. There is less 2½ per second wave and spike activity in hypoglycemia than in hyperglycemia.
2. Hyperglycemia is associated with relatively low and hypoglycemia with relatively high blood eosinophil counts.

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[*] This is apparent, irrespective of the way of analyzing the data. The per cent figures listed in column (b) of Table IV are computed from the relative paroxysmal discharge. These data, which evaluate "within day" variations of the amounts of paroxysmal discharge, are also indicative of a decrease in amounts of paroxysmal discharge at blood sugar values smaller than 50 mg. per cent.

Encephalopathy Following Pertussis Vaccine

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Serious cerebral damage in children following various immunization procedures has been observed for some time. The earliest recognized instance of such an encephalopathy appeared after the Pasteur treatment for rabies. Although the pathogenesis of the "encephalitis" is still a matter of speculation, most investigators agree that it is not an attenuated attack of rabies, but is a direct result of the immunization. Its incidence is about 1 in 1,000 cases. Though the incidence of such reactions following other immunization procedures is extremely low, the results of such injuries are so serious that the possibility of their occurrence should constantly be kept in mind.

Recent observations indicate that serious injury to the nervous system with a symptom complex consistent with encephalitis may follow the innoculation of prophylactic pertussis vaccine.[1–4] Several observers over the past fifteen years have mentioned isolated instances of such severe reactions. In an effort to determine the frequency of such reactions, Toomey[5] sent a questionnaire to pediatricians from all parts of the country regarding the occurrence of convulsions following pertussis vaccination. He obtained reports of 38 authenticated cases from 17 different sources in which children had convulsions after receiving an injection of the vaccine. There were two deaths; 23 were said to have recovered completely. All of the 12 cases reported by Buchanan showed irreversible changes. Although no precise figures can be given regarding the frequency of such reactions, they are obviously rare since the 38 cases represent the combined experience of many observers who collectively had administered the vaccine to many thousands of other children without any untoward results.

The first systemic study was that of Byers and Moll[4] who analyzed and reported clinical histories of 15 children observed at Children's Hospital in Boston over a period of ten years. The manifestations in most cases were similar and constitute a clearcut clinical syndrome. The children were regarded as normal before vaccination and no convulsions had ever been observed. They manifested convulsions and listlessness shortly after an injection, and subsequently exhibited residuals in the form of arrested development and recurrent convulsions. Vaccine was given in the usual dose. The reaction appeared after the first, second or third dose, with acute symptoms six to 72 hours following injection. Onset was usually abrupt with high fever, irritability, restlessness or drowsiness, followed by generalized or unilateral convulsions and coma. In all these cases followup studies showed evidence of cerebral damage. Other investigators[6] have reported similar reactions which varied in severity, with recoveries on one hand and an occasional death on the other.

All 15 cases of Byers and Moll survived the acute illness which subsided after two to ten days; two died subsequently of pneumonia after periods of progressive deterioration. Reasonably satisfactory recovery resulted in only one case. In nine others there were serious and permanent sequelae of varying severity. Of the 13 surviving children, recurrent convulsions persisted in nine; cerebral palsies were present in seven, two of whom were blind; two were "virtually decerebrate."

It is not without significance that with few exceptions convulsive seizures and lethargy dominate the manifestations in the affected child. These are often coupled with other features indicative of severe damage to the brain.

The pathogenesis of this type of encephalitis is still subject to considerable speculation. It has been suggested that it is due to the action of specific bacterial toxins found in the vaccine. However, the toxins formed by the hemophilus pertussis are unstable, and it would seem unlikely that they could retain their activity in the vaccine for any significant length of time. Apparently the pathogenesis is not due to a faulty or contaminated vaccine. The autopsy material is too scant to warrant any definite conclusions, although what is available would suggest a toxic or degenerative process rather than a local infection. The absence of inflammatory alterations or necrotic changes in the blood vessels and the degenerative character of the cerebrospinal system would lead one to conclude that the disease process was one that can be grouped with the primary degenerative encephalopathies —not an encephalitis in the usually accepted sense of the term.

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The rarity of such attacks strongly suggests that, whatever the mechanism, they must depend in part upon some individual peculiarity or predisposition. It therefore appears that the nervous system of the affected children reacted to the introduction of the vaccine.

At the present time two other factors are being considered as a cause of these grave reactions —an intravenous spread of the injected vaccine and an antigen-antibody response to previous specific desensitization. The view that they are the result of a local allergic reaction (antigen-antibody reaction) has been supported, among others, by Ferraro.[7] One would have to assume a localized reaction in which the brain functions as a shock organ.

Although the evidence is not conclusive, it seems most probable that the encephalitis following pertussis vaccine is due to a local antigen-antibody (allergic) reaction. The same may well be true of the cases associated with smallpox, rabies vaccine and the viral infections.

Recently two infants have been observed within a period of three months at the Virginia Municipal Hospital who manifested symptoms and signs of severe cerebral involvement after the injection of diphtheria-pertussis-tetanus combined vaccine.

CASE REPORTS

Case 1. F. B., a male infant of ten months, was admitted to Virginia Municipal Hospital on January 17, 1949. The complaint was fever of three days duration, varying up to 103.8.° There was a slight cough and moderate wheezing. He was extremely listless and very drowsy. He refused food but took fluids reluctantly and vomited two or three times. One week previously he was seen in the office for routine care. His physical examination was essentially negative, and he was given his first innoculation of diphtheria, pertussis and tetanus vaccine, 0.5 cc. intramuscularly in the deltoid. In the past history, this infant was hospitalized at the age of seven months with a complaint of wheezing and choking type of cough of three weeks duration. X-ray films taken at that time revealed a marked widening of the mediastinum consistent with an enlarged thymus gland. He responded to x-ray therapy and symptomatic treatment. With the exception of a few episodes of wheezing, the infant remained well until the present illness. The family history was essentially negative with the exception of a history of allergy on the maternal side of the family.

Examination revealed a well nourished and well developed male infant weighing 25 pounds, in apparent respiratory distress, appearing somnolent and restless. Rectal temperature was 103.8°. There were a few musical rales scattered throughout both lung fields. Neurological examination revealed muscular twitchings and poor response to stimuli. The pupils responded sluggishly to light.

Laboratory tests showed there was no anemia. The white blood cell count was 14,600 with 66 per cent polymorphonuclears. Spinal puncture revealed a clear fluid, not under increased pressure, no cells, protein 119 mg. per cent, and sugar 96 mg. Wassermann and Kline were negative. Chest roentgenograms on admission revealed increased markings consistent with bronchitis.

On January 20, the third day of admission, about 9:00 a.m. there was a sudden onset of cyanosis and convulsions. The convulsions were generalized at first; then involved the left arm and a twitching of the left eyelid. A rotary nystagmus was present. The temperature went to 106.0° and remained there for three hours. At 2:00 p.m. the skin became mottled, respirations shallow, and generalized body twitchings developed. The eyes still displayed a rotatory nystagmus. The child was given serum albumin concentrate, citrated blood and adrenal cortical extract. At 4:00 p.m. he ceased breathing, became very cyanotic and pulseless. He responded to stimulants—Coramine, caffeine sodium benzoate and oxygen and artificial respiration. At 7:30 p.m. muscular twitchings recurred. The color was good in the oxygen, but breathing was Cheyne-Stokes in character.

A spinal tap at this time showed an increase in pressure but no other significant changes. The next morning the color was good and respirations were satisfactory, but he was stuporous, unable to arouse. For the next three days he had frequent spells where respirations ceased, but would start again with artificial respiration. He stared into space and the pupils would not react to light. On January 23, he developed several left-sided spasms with alternating tonic and clonic contractions. On January 24, his condition was much improved and he was able to get along without oxygen. He was still stuporous, but the reaction to stimuli seemed more prompt. Temperature was normal and there was no spasticity or twitching. On January 25, at 2:30 p.m. there was a sudden onset of cyanosis followed by a generalized convulsion, and he expired.

Postmortem examination showed a bronchopneumonia in the right upper lobe. All other viscera were within normal limits. On opening the skull the dura was smooth. The anterior base of the brain showed nothing of note. The subarachnoidal fluid was clear. The fluid in the ventricles was clear. The convolutions of the brain were markedly flattened. Brain tissue was edematous and showed a few minute hemorrhages. Microscopic examination did not reveal any inflammatory changes or necrotic changes in the blood vessels. The changes were degenerative in the brain tissue.

The clinical manifestations in this case were severe from the outset, progressive and led ultimately to death. The postmortem observations are in full accord with a widespread disintegration of the brain. Because of the absence of inflammatory changes and the exclusive degenerative character of the brain, one would be justified in concluding that the disease process could be grouped with the primary encephalopathies, rather than an encephalitis in the usual sense of the term. The diagnosis of postvaccinal encephalopathy, possibly allergic, seems justified in this case.

Case 2. D. B., a female infant of four and a half months, was admitted to Virginia Municipal Hospital on April 11, 1949 with a complaint of sudden onset of fever of 106.6°. She had been listless and rather lethargic most of the day and refused food. Milk was also refused but she took water frequently. On April 8, three days previously, she was seen at the office for routine checkup. She appeared to be in a good state of health. Growth and development were normal for her age, and she appeared very alert. She was given the first inoculation of diphtheria pertussis and tetanus vaccine, 0.5 cc. intramuscularly in the right deltoid.

In the past history, this infant was hospitalized at age of five weeks after a bus trip from Texas because of severe malnutrition and secondary anemia. She responded rapidly to transfusions of citrated blood and diet. This child was a premature infant and was born with one tooth. At the age of four weeks she cut a second tooth.

Examination revealed an acutely ill female infant, well nourished and well developed. Rectal temperature was 106°. There was occasional muscular twitching and moderate nuchal rigidity. The fontanel was tense but there was no bulging. The right pupil was fixed and did not react to light. There was a rotatory nystagmus. Breathing was normal with a few scattered moist rales. A soft systolic murmur was present at the apex. Lips and nails were cyanotic and the infant was stuporous. Spinal tap revealed a clear fluid with no increase in pressure, 8 cells, protein 65 mg. per cent, and the sugar 90 mg. Wassermann and Kline were negative. The hemoglobin was 12.5 g., red blood count 4,200,000, white blood count 14,800 with 86 per cent lymphocytes, 13 polymorphonuclears and one monocyte. Urine was negative. X-ray films of the chest showed increase in markings consistent with bronchitis.

On the morning after admission the temperature was down to 99°. Oxygen was administered because of cyanosis, but respirations were normal. The child was stuporous and refused nourishment. The fontanel was soft, but there was moderate nuchal rigidity. At noon there was a sudden onset of generalized convulsions persisting for 50 minutes. After the convulsions temperature rose to 110°, which was checked on four different thermometers. Temperature remained high for two hours but responded gradually to hydrotherapy, and by 7:30 p.m. was down to 98°, a drop of twelve degrees. Respirations were rapid and stertorous, and the infant was comatose. For the next five days she remained in oxygen and temperature was in normal range. The infant was unable to swallow and was fed by gavage. Parenteral fluids included citrated blood. Arms and legs were rigid, pupils were fixed and dilated, and she stared into space. On April 20, she was still comatose and rigid; her color was improved and she was able to be out of oxygen for long periods.

On April 23, she started swallowing with difficulty, and was no longer rigid. The light reflex was still absent. She was afebrile. On May 1, 1949, she started swallowing without too much difficulty and took the bottle fairly well. There were now alternating spells of spasticity and flaccidity and generalized body twitchings. She appeared blind, had no blinking reflex, did not follow light, and her pupils did not react to light. Since ophthalmoscopic examination revealed a normal media and fundus, it was thought that the infant was blind from a central lesion. X-ray films of the skull taken on June 13, two months after onset, revealed findings consistent with a moderate hydrocephalus; there was a moderate spreading of the suture lines.

The infant was discharged on September 29, at the age of ten months after hospitalization of 172 days. At the time of discharge she was blind and spastic. There were from two to 15 convulsive seizures daily which were reduced in severity by Seconal given rectally, 1½ grains t.i.d. She was unable to sit up or support her back. She was discharged to a boarding mother who was a practical nurse.

For the next 18 months she remained a hopeless underdeveloped infant. There was marked retarded growth and development. At the age of two years she still was unable to sit up and had no control of the head. She was still spastic and blind. She was now having five to 20 convulsions a day. She started to refuse nourishment and became very restless in spite of sedation. She was admitted to the hospital on March 9 for a period of 20 days. Blood and urine were normal on this admission. The convulsive seizures were controlled somewhat with chloral hydrate and barbiturates. She was discharged on March 29, 1951, to a boarding home. The convulsions became progressively worse and she expired suddenly on April 10, at the age of two and a half years. Postmortem examination could not be done since the child died in another city.

This case also was severe from the outset, but the child lived a little more than two years after the acute episode. She displayed severe cerebral damage as evidenced by her clinical course.

COMMENT AND SUMMARY

It is obvious that the nervous system of these two infants reacted directly to the introduction of diphtheria-pertussis-tetanus vaccine. The reaction was alarming from the start and resulted in death in both cases, one in the acute phase, the other progressive and irreversible. In the first case postmortem examination showed degenerative changes in the brain. Microscopic sections were non-inflammatory in character, suggesting an encephalopathy caused by an allergic reaction.

Several factors are being considered as a cause of these grave reactions: (1) An intravenous spread of the injected vaccine; (2) the action of pyrogens liberated by bacterial organisms; (3) damage to the brain caused by toxin present in the vaccine; (4) a constitutional reaction inherent in the affected child; and finally, (5) an allergic reaction—an antigen-antibody response to specific desensitization.

One may come to the conclusion that inoculation with pertussis vaccine involves a definite risk, though remote, of causing damaging encephalitis. Though the incidence is comparable to that of encephalitis following smallpox vac-

(Continued on page 271)

Lancet CLINICAL REVIEWS

This department of The Journal-Lancet *is devoted to reports on cases in which all the appropriate diagnostic criteria have been employed, the best known treatment administered and the results recorded. It is desired that these case reports be so prepared that they may be read with profit by physicians in general practice, hospital residents and interns and may be of considerable value to junior and senior students of medicine. This department welcomes such reports from individuals or groups of physicians who have suitable cases which they desire to present.*

A Fatal Case of Diphtheria Complicated by Myocarditis and Pericardial Effusion*

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This is the case of a five year old Indian boy admitted to Minneapolis General Hospital on December 6, 1950, as a diphtheria carrier. One month prior to admission he got a sliver of wood in his left great toe but did well subsequently with no particular complaints. On November 15, 1950, he was exposed to diphtheria in a neighbor girl who died one week thereafter. The patient had played with the neighbor a few days before she became ill. Subsequent to her death throat cultures were taken by the Minneapolis City Board of Health and were reported as positive for diphtheria. Since living conditions were so crowded at home, it was thought best to isolate him in the hospital. Further history revealed that he had been exposed to scarlet fever on November 10, 1950 and developed a febrile two-day illness on November 22 and 23, 1950. This was associated with fine red rash over the trunk and pain in both hips. History of a sore throat was denied. About two weeks prior to admission, the left great toe began to swell and became tender. About a week prior to admission he was brought to the emergency service of the hospital where the splinter was removed and 300,000 U. of penicillin were given. The wound remained open until the time of admission and he continued to complain of pain in left foot and groin. At this time he complained of general malaise for a week's duration and swelling of the eyelids and a croupy cough for a similar period. History of sore throat was denied.

Past history revealed him to have been well. He had had measles, mumps and chickenpox during 1949 but was not very ill with any of these diseases. He had received no immunization inoculations. He had been on a fairly well-balanced diet. His maternal grandmother who contributed to his care was said by the parents to have been told by a doctor she had active pulmonary tuberculosis. Since no medical report was available this was never confirmed. The patient's mother had tuberculosis at the age of five years. Two years before she had a spontaneous pneumothorax and was treated in the University of Minnesota Hospitals. No active tuberculosis was diagnosed. Roentgen examination of mother and father in December 1950 showed no evidence of pulmonary tuberculosis.

Physical examination showed the temperature to be 99.6° (rectal), pulse 108, blood pressure 85/50. He did not appear to be acutely ill. He was well developed and well nourished. There was a fullness and roundness to his facial contour that was thought compatible with his Mongolian ancestry. No eyelid edema was noted. Examination of the throat showed it to be mildly injected. There was no exudate or evidence of membrane formation. He had a soft apical systolic murmur. There was one plus pitting edema of the left lower leg and on the plantar surface of the left great toe was a shallow ulcer measuring two by one centimeters that was surrounded by very little erythema and covered by a gray-yellow exudate. It was sensitive to touch.

Cultures of the nose and throat and of the plantar ulcer were taken and planted on blood agar and Loeffler's media. Nose and throat smears and cultures were negative. A culture from the lesion on the left great toe was reported "occasional organism present, suspicious of diphtheria." Subsequent cultures of the nose and throat and left toe were negative. Routine hemogram showed the hemoglobin to be 13.4 grams, white blood count 11,850 with 66 per cent neutrophiles, 27 per cent lymphocytes, 4 per cent monocytes, 3 per cent eosinophiles. Urinalysis showed a specific gravity of 1.032, acid reaction, one-plus albumin, negative sugar, one to two hyaline and five to eight granular casts per lowpower field, and two to four pus cells per highpower field. The erythrocyte sedimentation rate was 14 mm. in 60 minutes on December 7, 1950 and 1 mm. in 60 minutes on December 12, 1950. The serum mucoprotein level was 3 gm. per cent on one occasion and 3.5 gm. per cent on another. Mantoux skin tests at 1:1000 and 1:100 were negative. Schick test was negative. Roentgen examination of the chest showed the presence of pleural effusion at the right base and moderate generalized cardiac enlargement (figure 1).

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*From the department of pediatrics, University of Minnesota, and Minneapolis General Hospital, Minneapolis, Minnesota.

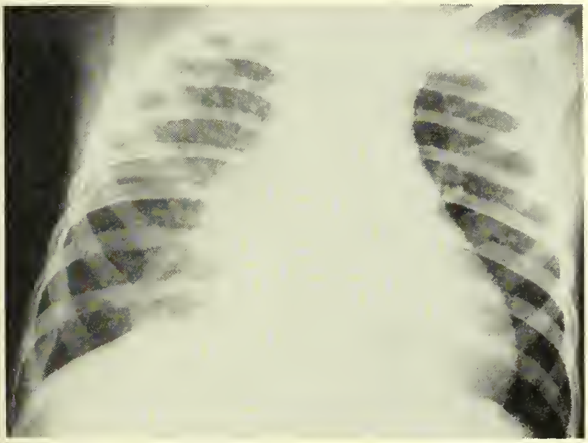

Fig. 1. Roentgenogram taken on admission showing generalized cardiac enlargement and right pleural effusion.

He was placed on penicillin 400,000 units twice daily intramuscularly, tetanus antitoxin 3,000 units, and hot foot soaks, as well as vitamins A, D and C. By the third hospital day the ulcer was considerably improved. He had felt fairly well until this time. His oral temperature varied between 99.6° and 100° F. His pulse varied between 100 and 120. On this day it was noted for the first time that his liver was enlarged to 4 cm. below the right costal margin. Bromosulphalein showed 15 per cent retention in 45 minutes. The cephalin cholesterol flocculation test was 3 plus. He became progressively more anorexic and on the fifth hospital day was dyspneic and had an emesis. At this time enlargement of cardiac dullness, tachycardia of 140/min., distant heart sounds which were of poor quality and of gallop rhythm and paradoxical pulse were observed. The blood pressure was 85/70 mm. Hg. The liver edge was 6 cm. below the right costal margin and exquisitely tender. Roentgen examination (figure 2) showed increase in size of pleural effusion and in heart size suggestive of pericardiac effusion. An electrocardiogram showed marked decrease in voltage of all complexes, isoelectric T2 and T3. There was no evidence of conduction defect. Pericardiocentesis was done using the subcostal route. Fifteen cubic centimeters of straw colored fluid were removed when he became agitated and moved about in bed causing movement of the intrapericardial needle. At this time the fluid became bloody. The procedure was terminated and general anesthesia with Pentothal Sodium was introduced after which 55 cc. of bloody fluid were removed from

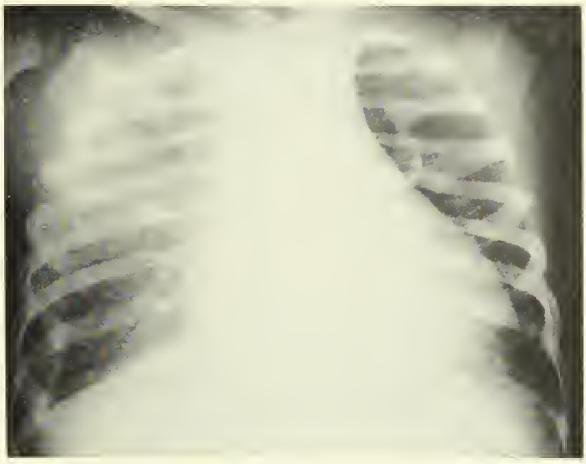

Fig. 2A. Roentgenogram taken four days after admission showing further increase in heart size and pleural effusion.

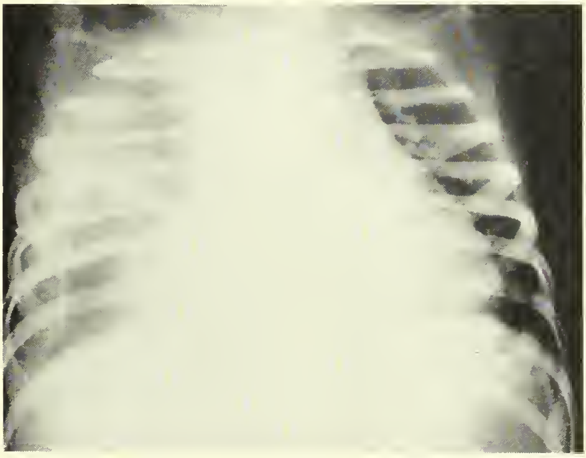

Fig. 2B. Roentgenogram taken in the supine position showing marked widening of superior mediastinum.

the intercostal route. A specimen of the fluid removed from the pericardial sac was sent to the Minneapolis Public Health Department for acid fast smear and culture. It was reported sterile. After the procedure he was placed in oxygen, his heart sounds became stronger, pulse stronger although still paradoxical, and he appeared to be more comfortable. The blood pressure did not change.

On the seventh hospital day 20,000 units of diphtheria anti-toxin were given on the basis of the questionable diphtheria culture from the toe ulcer. He was also started on 20 mgm. of ACTH* (adrenocorticotropic hormone) every four hours. This was continued for three days. On the eighth hospital day he appeared to have improved some. His heart tones were more distinct and the gallop rhythm had disappeared. The liver was still enlarged 4 cm. and could be felt to pulsate. The electrocardiogram showed a rate of 140, a PR interval of .10, sinus tachycardia, and low potential of all complexes and isoelectric T2 and T3 with ST segments also being isoelectric.

On the ninth hospital day the condition appeared to be unchanged except that the gallop rhythm had returned. It was felt that as long as he tolerated fluid in the pericardium he should not be tapped but that with any further evidence of cardiac tamponade pericardiocentesis would be mandatory. ACTH was discontinued this day as little benefit was apparent.

On the tenth hospital day he looked somewhat more lethargic. The gallop rhythm and pulsating hepatomegaly persisted and he was slightly orthopneic. Roentgenograms of chest showed increase in pleural effusion on the right side. Thoracentesis was done and 500 cc. of straw colored fluid were removed. It showed 1.95 gm. per cent protein and cultures were sterile. On this day his brother, age 11 months, was admitted to Minneapolis General Hospital with a diagnosis of diphtheria carrier. His Mantoux test was positive 1:1000.

On the eleventh hospital day his condition deteriorated. He became cyanotic, dyspneic, pulse increased to 180 and blood pressure was unobtainable. Pericardiocentesis was done and 45 cc. of serosanguineous fluid were removed. He rallied slightly after this. The fluid contained five mononuclear cells per cu. mm. and had a specific gravity of 1.019. It was too bloody for protein determination. Culture and smear for acid fast organisms were reported as negative. About the thoracentesis site on the right posteriorly subcutaneous emphysema developed and extended into the axilla and up the back. This disappeared in twenty-four hours. No evidence of mediastinal emphysema was seen on the roentgenograms but there was a large increase in the amount of fluid in the right side of the chest. Five hundred cubic centimeters of fluid were removed and a catheter was placed in the chest and intermittent closed suction was initiated. At this time it was decided to start streptomycin as the strong family history of tuberculosis had just come to our attention. He was given two grams a day. The intrathoracic catheter removed about 700 cc. of serosanguineous fluid a day. It continued to be sterile on both routine culture and culture for acid fast bacilli. The high protein content of fluid persisted. He was then placed on a high protein formula containing 95 gm./liter. This was given by gavage approximately 600 cc. a day.

His condition improved somewhat in that he became less dyspneic. The pulse dropped from 180 to 100–120 and the blood pressure was obtainable at 80–90/60–70 mm. Hg. On the fourteenth day he developed acute gastric dilatation which was corrected easily by Wangensteen suction. He became noticeably weaker, however, and was irrational and somnolent. He was given both whole blood and plasma. He was digitalized with digitoxin (.4 mg. every six hours and 0.1 mg. every day) but showed no clinical or electrocardiogram change. Serial electrocardiograms since admission had shown no essential change since the first tracing. His respirations became more labored and irregular and he died quietly on the fifteenth hospital day.

Laboratory data obtained two days before he died showed the plasma proteins to be 4.8 gm. per cent with an AG ratio of 2.76/2.04. The serum chlorides were 98 me/L. The BUN was 25 mg. per cent. The urine consistently showed 1 to 2 plus albumin and hyaline and granular casts. The white blood count rose to 15,000 with 85 per cent neutrophiles. The hemoglobin remained between 11 and 12 gm. per cent. The temperature varied between 99.6° and 101.0° F. (oral). Repeated cultures of pleural and pericardial fluids were sterile.

Postmortem examination showed pericardial effusion, the pericardial cavity containing about 200 cc. of straw colored fluid. The heart was enlarged weighing 150 gm. There was an antemortem thrombus in the right atrial appendage. Microscopic study of the myocardial tissue showed irregular loss of color and disintegration of myocardial muscle bundles. The nuclei in these areas showed loss of detail and appeared lysed. Review of the slides by the staff pathologists at the University of Minnesota Medical School produced unanimity of opinion that the patient had a resolving myocarditis but not typical of diphtheritic myocarditis. Further examination showed pleural effusion of 80 cc. of bloody cloudy fluid, multiple pulmonary small infarcts with thrombosed central arteries. There was also hepatic passive congestion. The small bowel showed multiple submucosal hemorrhages into villous processes. Mucosa was not thickened and bowel wall appeared normal. Brain and meninges, thyroid, pancreas, lymph nodes, testis, spleen, kidneys and adrenals were not remarkable. The toe ulcer showed chronic inflammation with fibrous proliferation.

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*The ACTH was kindly supplied by the Armour Laboratories, Chicago, Illinois.

DISCUSSION

In reviewing the history the most salient feature was the exposure to a fatal case of diphtheria on November 15, 1950. About one week later he had an illness the nature of which was not clear. Subsequent to this time, however, he felt poorly in that he had malaise, a croupy cough, and some swelling of the eyelids just prior to admission on December 6, 1950. Shortly before admission Corynebacterium diphtheriae were cultured from his throat. This history was compatible with diphtheria, possibly laryngeal, complicated by myocarditis. The presence of negative Schick test in the absence of previous immunization against diphtheria corroborated this assumption. Diphtheria antitoxin probably was unnecessary in the presence of a negative Schick. The development of pericardial effusion with diphtheritic myocarditis was unprecedented as far as we knew. Kay and Livingood,[2] reported a case in 1946. Diphtheritic endocarditis and valvulitis have been reported.[3]

Endocardial mural thrombi in diphtheritic myocarditis have been reported[4,5] and are thought to be due to either auricular fibrillation or muscle necrosis. The presence of a thrombus in the right atrium perhaps contributed to the increased venous pressure and the development of pleural effusion although cardiac failure no doubt was a primary factor. Pulmonary emboli originating from a cardiac mural thrombus, may have produced the pulmonary infarction.

Cutaneous diphtheria was found to be the cause of toxic myocarditis in 5 per cent of cases as reported by Kay and Livingood in a review of United States Army patients.[6] They found that the size of the cutaneous lesion was directly related to the development of myocarditis, which most frequently occurred four to seven weeks following onset of the ulcer. The ulcer[7] usually is deep with rolled edges and covered with a yellow-gray membrane. It is usually painless. These facts and the lack of bacteriologic findings lend support against cutaneous diphtheria being the incipient cause of the patient's illness.

Rheumatic fever doesn't seem a likely diagnosis. The erythrocyte sedimentation rate was normal although the patient was in cardiac failure and therefore the test was not as reliable. The presence of normal mucoprotein levels mitigates against this diagnosis.[8] Exposure to scarlet fever was followed by fever and exanthem but the incubation period was too long for scarlet fever.

In a review of the pathologic myocardial changes in diphtheritic myocarditis, Gore,[9] after studying tissue from those cases dying both early and late during their illness reports many different changes. When death occurs early there are mild interstitial edema and cloudy swelling of the muscle fibers. The cells of the interstitium are hyperplastic and plump but not increased in number and there is no inflammatory cell infiltrate. If they expire in the second week of their clinically recognizable myocarditis there are foci of hyaline and granular degeneration of segments of muscle. Some fibers are attenuated, fragmented or ruptured. There is a mild cellular response thought to be reparative. Most of the cells are histiocytes. After the second week plasma cells and lymphocytes occur although histiocytes still predominate. Hyaline and granular degeneration is still extensive. After the third week there is myolysis of degenerated muscle fibers and the myocardium grossly appears streaked and subsequently there is hyperplasia of good remaining muscle cells. If such an area happens to be immediately adjacent to the endocardium the alterations in that layer may lead to the formation of a mural thrombus. Fat infiltration may occur at any time during the course of the myocarditis. With the protracted clinical course the patient displayed it would seem that sufficient reparation of heart muscle tissue could have occurred to obscure the typical findings seen earlier in the disease.

CONCLUSION

It is likely that the patient had unrecognized diphtheria, probably laryngeal, complicated by myocarditis with failure and the formation of pericardial and pleural effusion. Pericardial effusion accompanying diphtheritic myocarditis has not been hitherto described.

(Continued on page 272)

Seasonal Dermatoses of Spring and Summer*

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Every season of the year brings with it its own dermatologic problems. In the winter we examine and treat many cases of eczema, witness exacerbations in psoriasis patients, and observe various manifestations of dry skin. With the advent of spring these dermatoses have decreased in volume, and new types of cases begin to present themselves. In this paper I plan to discuss, in a general manner, sunlight sensitivity; pityriasis rosea and erythema multiforme, both of which disorders have a high incidence in the spring and fall; insect bites with special reference to the new insecticides and insect repellents; and plant dermatitis, more specifically poison ivy dermatitis with emphasis on prophylaxis and treatment.

SUNLIGHT SENSITIVITY

There are several somewhat rare, yet interesting, conditions in which exposure to sunlight plays a role. They include such entities as Hutchinson's summer prurigo, hydroa aestivale, urticaria solare, and so on.[1] In these conditions a true photo-sensitivity or photo-allergy exists. The eruptions, which develop on the exposed portions of the body, are classified, in general, as examples of solar dermatitis.[2]

Last spring I saw several persons who demonstrated a sunlight sensitivity. The eruption was, in general, confined to the ears, cheeks, nose, and dorsal surfaces of the hands. It was characterized by an urticarial erythema and in some instances by papules and even bullae. In almost all instances a history was obtained which indicated that the eruption had appeared at approximately the same time in previous years, lasted two or three weeks, and gradually left. In these cases we believe a temporary immunity is developed as increasing exposure to sunlight is obtained. In children such eruptions usually disappear spontaneously at puberty. However, in other varieties of solar dermatitis, the eruption may first appear in adult life and persist indefinitely, remaining aggravated as long as sunlight exposure is maintained. In most of these cases the eruption regresses slowly in the fall with the advent of less intense solar radiation only to reappear the following spring.

Aside from these unusual cases, we should remain aware of other medical disorders in which photo-sensitivity may be one of the outstanding symptoms. Porphyria, that rare familial metabolic fault in which abnormal kinds and amounts of porphyrin are excreted in the urine and feces is frequently first suspected when signs of photo-sensitivity become manifest.[3] Last summer a patient presented himself with a bullous eruption on the back of his hands and on the posterior aspect of his neck. A photo-sensitivity was suspected. On further questioning it was learned that the patient had passed red urine on several occasions within recent weeks. The tentative diagnosis of chronic porphyria was confirmed by demonstrating a marked excess of uro and coproporphyrins in the urine by chemical and spectroscopic means. The various types of porphyria can be classified as congenital, acute, and chronic with modifications of these terms. This man, by other standards, would be classified as a case of mixed or cutanea tardive porphyria. In this type the disease may first become manifest in adult life in the form of a bullous reaction on the exposed surfaces of the skin. Very frequently evidence of hepatic dysfunction exists, and a history of chronic alcoholism is often obtained.

Acute disseminated lupus erythematosus may be precipitated or aggravated by sunlight exposure. In these cases it is felt that an acquired light sensitivity due to circulating toxins possibly exists, but that sunlight itself has little if anything to do with the actual etiology of the disease. Herpes simplex, erythema multiforme, drug sensitivities, and other conditions may be induced by sunlight.

The sunburn spectrum of the ultraviolet lies between 2900 and 3100 A°. Within recent years several products have become available which are effective in protecting against sunburn. The antihistaminics, especially two per cent Pyribenzamine cream, when applied locally protect against sunburn. This is not due to its socalled "antihistaminic action" but rather to the physical properties of the drug. It absorbs the active wave lengths causing sunburn and thereby prevents their reaching the skin. The absorption curve of Pyribenzamine shows a high extinction peak in the zones producing ultraviolet erythema. Most antihistaminics when taken orally produce a rise in the threshold erythema. Benadryl seems to be most effective in this regard.

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*Presented at the sixty-fourth annual meeting of the North Dakota State Medical Association, Bismarck, North Dakota, May 19-22, 1951.

†Fargo Clinic, Fargo, North Dakota.

Para-amino-benzoic acid has an absorption band which embraces all the sunburn rays. It remains essentially unchanged even after intense irradiation, is non-toxic and non-irritating for human skin. A product which contains five per cent menthyl anthranilate (a substance related to para-amino-benzoic acid) and five per cent titanium dioxide is available under the name of A-fil cream,* and is most acceptable.

PITYRIASIS ROSEA

Pityriasis rosea is an acute, self-limited, eruptive disease which occurs most commonly in the spring and autumn. The disorder is characterized by superficial, pale red, scaling patches, usually oval in outline, and situated chiefly on the trunk and proximal extremities. The long axis of the oval patches is along the lines of cleavage of the skin. A primary lesion or "mother plaque" very often precedes the general outbreak by seven to ten days. The eruption persists for four to six weeks and disappears spontaneously. There is no specific treatment.

Many investigators believe in the infectious origin of pityriasis rosea, and several have observed spores in scales from the lesions. However, the true etiology remains obscure although in all probability an infectious agent is responsible. Lassar and Jadassohn were among the first to emphasize that pityriasis rosea very frequently follows shortly after the wearing of new or stored clothing. New clothing may account for the apparent increased incidence of pityriasis rosea in pregnant women as compared with non-pregnant women in the same age groups.[4] The increased incidence of pityriasis rosea in the spring and fall may possibly be attributed to clothing unpacked or purchased in expectation of the coming season.

ERYTHEMA MULTIFORME

Erythema multiforme is another dermatosis which is said to occur most frequently in spring and fall. There are wide variations in this disease ranging from a few trivial skin lesions to severe toxic reactions which may involve the entire integument in addition to the palpebral conjunctiva of the eyes, the mucous membranes of the mouth, anus, and genitalia. Severe forms constitute the socalled Stevens-Johnson syndrome, bearing the names of the men who first described it in 1922. In these cases there is evidence that a virus of the psittacosis group may be causative.

The mildest variety is known as the idiopathic form, and was described originally by Alibert and later by Hebra. It is this mild form of the disease which is most likely to be seasonal. The eruption is characterized by crimson-red or purplish-red edematous-looking macules or flat papules. Occasionally vesicles or bullae are present. The lesions are symmetrical and are usually found on the dorsa of hands and feet, legs, forearms, and often on the face, especially around the mouth. Although the eruption is multiform, a common lesion is the socalled herpes iris or "target" lesion. It is essentially a maculo-papule with a depressed or vesicular center and a periphery of variously colored concentric rings. The disease usually runs its course in from two to four weeks and is commonly recurrent at the same time each year. It is most frequently seen in children and young adults. The cause is unknown, but its allergic nature is suggested by the fact that often erythema multiforme is seen following vaccination or serum injections, accompanying various visceral diseases, or following the ingestion of drugs, chief among which are quinine, chloral hydrate, bromides, and salicylic acid compounds. The seasonal incidence of the idiopathic form remains unexplained.

INSECT BITES

Insect bites are a universal affliction during the summer. Most people make their own diagnosis of bug bites and either ignore them or employ home remedies for their management. However, more often than might be suspected, the physician is consulted because the patient is unaware of the cause of his complaints. The diagnosis of insect bites is rather simple. The lesions usually consist of urticarial wheals, papules, or even ecchymotic spots which on close inspection frequently show a central puncture mark. The grouping of the lesions or the occurrence of the lesions in a linear pattern is characteristic and reflects the feeding habits of the insect.

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*Texas Pharmacal Company.

Many patients are not concerned with the insect bites they display. Rather they are anxious to know methods of avoiding further annoyance. You are already familiar with some of the newer insecticides and repellents, especially DDT and its analogues including DDD, TDE, and others. These materials have a very low toxicity for human beings if used as directed. They are effective in killing most arthropods but are not effective against ticks. However, Chlordane, another new insecticide, is effective against ticks and mites and fills this gap. Toxaphene is effective in the control of bedbugs. Other valuable insecticides include the gamma isomer of hexachlorocyclohexane which is commercially available in one per cent concentration as Kwell ointment for use in scabies and pediculosis, but it may also be used as a spray for the control of other insects. Crotonyl N-ethyl o-toluidide is another chemical which was introduced from Switzerland under the name of Eurax. This substance is apparently effective for the control of pruritus from any cause, but is essentially an insecticide of value in treating scabies and in controlling many other insect pests.

Early in World War II a great stimulus was given to the search for effective insect repellents. Thousands of compounds were tested for their repellent qualities. Some excellent products were obtained, and further intensive work along these lines is still in progress. Most of you are probably familiar with some of the older so-called repellents, chief among which was oil of citronella. Its value as an insect repellent has always been open to question, but certainly it helped to repel human being against human being. Most of the newer repellents are quite effective and are available commercially.[5,6] Their repellent action against insects is rated as good to excellent. For example, it is reported that the United States Naval Medical Research Institute's compound 448 will repel mosquitoes for eight hours or longer. Against ticks, the repellent activity is said to last for as long as twelve days. This substance is available under the trade name "448". It is a mixture of two cyclohexyl cyclohexanol and two phenyl cyclohexanol. Rutger's 612, available commercially as "6-12" is pure ethylhexanedial. Other repellents for general use include dimethylphthalate and the socalled 6:2:2 mixture which is essentially a mixture of "6-12" plus Indalone. These repellents are available in most drugstores, and the physician can feel quite confident in recommending their use to his patients. They all have been subjected to adequate clinical trial, have low sensitizing indices, and produce very few toxic reactions. Organic types of solvents are usually used for these chemicals. The burning and irritation which some persons experience during their application may be largely due to the vehicle. The use of these materials around the eyes and lips and on sunburned skin may be uncomfortable.

Orally ingested repellents have recently attracted renewed interest. Some years ago Shannon[7] claimed that thiamine hydrochloride (vitamin B_1) when taken orally in doses of approximately 100 mg. a day for several days somehow rendered the patient immune or not susceptible to bites from fleas and mosquitoes. After the initial doses the subsequent daily dosage could be reduced to as little as 10 mg. a day and still maintain an effective immunity. Because of the importance of the mosquito problem to the military forces during the last war, naval research investigators looked into this claim. On the basis of only limited experimentation in which a total of only four subjects was employed these investigators discredited oral thiamine hydrochloride as a repellent.[8] In view of the support it has received from other quarters, it may be reasonable to assume that it works in some people and not in others. It is a relatively harmless drug and can be kept in mind.

Other work pertaining to orally ingested repellents is still in the animal experimental stage. For example, hexachlorocyclohexane (Kwell), when fed to rabbits, protects them against mosquitoes but not against pediculi. These experiments open an entire new field in relation to a technique of protection for human beings. However, detailed knowledge of systemic toxicity must be forthcoming before any of these compounds can be released for general use. Other new developments in this field include the impregnation of clothing with repellents and insecticides. The process has been so perfected that the chemicals are not removed even after a number of ordinary washings.

POISON IVY DERMATITIS

Treatment. No discussion of summer dermatoses would be complete without a consideration of poison ivy dermatitis. At the present time there is no completely effective means of protection other than avoidance of contact. The lack of effective prophylactic and therapeutic procedures in poison ivy dermatitis is simply a reflection of our scanty knowledge on the mechanisms involved in contact dermatitis in general. The work of Landsteiner and Chase has recently demonstrated the importance of the lymphatic system in sensitivity development. Valuable research along these lines is continuing, and in the future we may be more enlightened on this subject.

Rhus dermatitis is the general name given to contact dermatitis caused by poison ivy, poison oak, and poison sumac. One toxic substance is common to all these plants. Its chemical nature has been known for many years. Its action on the skin is that of a vesicant. After contact with the skin, very little is known concerning the fate of this toxic agent, and likewise knowledge of the body's defense mechanisms mobilized against this material is extremely vague. Oxidizing agents such as potassium permanganate, ferric chloride, and others have long been used in the treatment of poison ivy dermatitis because it has been known for some time that oxidation destroys the vesicant properties of the plant oleoresin. However, their use has been, at best, only partially successful because by the time the condition is recognized the damage has already been done, and the sensitivity reactions are beyond the stage where neutralization of the offending agent is of any benefit.

In the present state of our knowledge the management of any case of poison ivy dermatitis is that of any acute dermatitis, namely soothing treatment employing wet packs and mild lotions. The physician should not deviate from this course of local therapy regardless of the severity of the case and withstanding the patient's frequent demands that something more active be done. There is no topical "fast cure." The management of complications, including secondary infection, is dictated by ordinary medical practices.

Spraying of the involved parts with freezing agents, such as ethyl chloride, still has its advocates and may be employed in cases with localized lesions.

The antihistaminics, aside from their sedative effect, are not generally considered to be useful in the management of poison ivy dermatitis.

Within recent years Klasson[9] has recommended the use of ascorbic acid in the treatment of acute Rhus dermatitis. Since one of the physiologic actions of ascorbic acid is to maintain vascular tone, it was hoped that it might thereby counteract the toxic effects of the plant oleoresin. In a controlled experiment it was shown that ascorbic acid has some beneficial and often dramatic effects. Itching was reduced, and the period of treatment was shortened. The drug is best administered intramuscularly in divided doses up to 600 mg. daily. This may be supplemented with oral administration since vitamin C is rapidly eliminated from the body.

The parenteral administration of crude poison ivy extracts (oleoresin) will be discussed again in a consideration of prophylaxis. It is mentioned here only to emphasize that most allergists and dermatologists throughout the country are convinced that the use of this substance during the acute phase of poison ivy dermatitis is totally without justification and may, in fact, further aggravate and prolong existing conditions. The most severe and protracted cases of poison ivy dermatitis which have come under my care have been those which have received injections of oleoresin after the dermatitis first appeared. The wisdom of introducing more antigen into the body at such a time has always been subject to question. Schamberg first proposed the idea many years ago, and it has provoked vigorous debate ever since. "Why add more fuel to the fire?" sums up the opposing sentiment. The question still remains unsettled. Only recently Keil[10] has claimed good results in treating acute cases of poison ivy dermatitis using a synthetic analogue of the active principle of the ivy plant. This material is not available commercially and the work needs confirmation. The soundest advice one can give a practitioner at this time is: Do not use the commercial poison ivy extracts to treat acute cases of poison ivy dermatitis! A specific therapeutic extract may be forthcoming, but there is none available for general use today.

Prophylaxis. Why do some individuals incur severe cases of poison ivy dermatitis while others, with the same degree of exposure, develop few if any symptoms? This question has long troubled those engaged in seeking an effective prophylactic against poison ivy. This "natural immunity" has recently been explained as follows: The oleoresins are destroyed by oxidation. The natural oxidases of the skin, principally tyrosinase, neutralize the ivy antigen by oxidation.[11] The ratio of oxidase to oxidase-inhibitor in the skin has been shown to be a genetic affair and varies from individual to individual. It is felt that in time some means may be available whereby immunity may be achieved, at least temporarily, by increasing the proportion of oxidase to oxidase-inhibitor in the skin. At the present time, there is no practical application for this interesting observation.

The practice of giving oleoresin early in the season in hope of inducing immunity is based on the assumption that an antigen-antibody system exists in Rhus dermatitis. Actually, this is a moot point. A person who has had poison ivy dermatitis obtains no immunity from his unfortunate experience. On the contrary, his sensitivity may be increased, and he may suffer with more severe involvement the next season. Crepea and Cooke[12] have shown that antibodies to ivy antigen do exist, but that they are weak and are not easily demonstrable. Certainly the protection obtained from injected crude oleoresin falls far short of expectations when one anticipates the protection afforded by bacterial and virus vaccines. To add to this frustration, Howell[13] has shown that the commercially available ivy extracts vary widely in their potency.

In the near future a more effective prophylactic may be readily available. Crude oleoresin contains various fractions. Efforts have been directed to the extraction and isolation of these fractions in an attempt to obtain a potent and effective antigen. Strauss and Spain[14] have prepared an aqueous alum-precipitated pyridine-ivy extract which they claim produces an effective immunity. Gaillard[15] has recently confirmed their work. This is apparently a very promising compound.[*]

There are some preparations which when applied locally afford protection against the oleoresin of poison ivy. Chloroamide-containing ointments were developed during World War II by the Chemical Warface Service of the United States Army to protect against the effects of vesicant gases such as mustard gas. These ointments inactivate the toxic material by oxidation and chlorination. Sulzberger and others[16] have shown that these ointments also protect against the vesicant action of plant oleoresin. However, their use presents some difficulties and is not very practical.

Klasson,[9] in a controlled experiment with soldiers in the field, has shown that ascorbic acid taken orally is an effective agent to ward off the effects of the oleoresin. The drug is prescribed in divided doses to a total of 300 mg. a day. It must be taken for at least one day prior to the anticipated exposure and continued for at least 48 hours after exposure. Klasson's studies showed that ascorbic acid so administered protected susceptible individuals while a control group developed the expected dermatitis. Of all the prophylactics this is at present the most readily available, the safest, and the most effective of all. I recommend it to you. An obvious handicap on its usefulness is that imposed by the necessity of foreseeing exposure.

We may conclude, as Prokesch[17] has done, that "Rhus dermatitis fits into a broader general picture in which many immunological, allergic, and biochemical factors play an important role. More successful methods of prevention and treatment may follow a more thorough understanding of these factors."

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[*] This material is not yet available commercially. Anyone interested in its use may obtain it at a nominal cost from Miss Margaret Strauss at the Allergy Laboratory, University Hospital, 303 E. 20th Street, New York 3, New York.

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This is the seventh in a series of letters to Dr. J. A. Myers and the readers of the Journal-Lancet *from Dr. Ancel Keys, director of the laboratory of physiological hygiene at the University of Minnesota, during a year of study and travel abroad. Other letters will follow in subsequent issues.*

Notes from a Medical Journey

28 March 1952, Oxford, England

Dear Jay:

Full spring was just coming on when we headed north from Naples two weeks ago but here it seems as chilly as it did in January, in spite of blossoms coming out and the daffodils thick in woods and gardens. The wintry feeling, I suppose, means only that we lost our tolerance for cold in Italy. Probably an aftermath of the 'flu which hung on and on, with all the tiresome sequence of bronchitis, sinusitis and plain malaise which sometimes follows. Now we are in reasonable shape but there seems to be a lot of 'flu in Europe and it is a rather mean type; I have even heard of a few deaths in a couple of days -- unpleasantly reminiscent of 1918.

We had a very successful month in Italy in spite of the 'flu and the fact we had the spare tire and our kit of auto parts stolen from the Hillman. Our Neapolitan friends, and the crowd that gathered when the theft was discovered were more indignant than we and there was quite an uproar. The general idea seemed to be that the honor of Naples -- and that of Italy in general -- had been besmirched; there were even remarks that such things did not happen in Mussolini's time but now everything was going to the dogs.

Anyway, the final score for Naples was an unforgettable memory of blue skies and sea, rugged mountains and throngs of people everywhere. And 87 clinically healthy men studied, nicely covering the age range from 20 to 55 years. This meant some 200 serum cholesterol analyses besides the other tests and measurements. The cholesterol work was technically good but the absolute values will not be known for certain until I get the checks on our standards sent by air mail to the Stadium for comparison with our Minnesota standards. Perhaps the main accomplishment will prove to be the arrangements we made for continued collaboration between Naples and Minneapolis -- if we can get a little financial help.

Speaking of money, I feel sorry for our Italian colleagues and, for that matter our academic colleagues in many parts of Europe. Salaries have woefully failed to keep pace with inflation and some other sources of income have dried up. In the old days an important addition to the professor's income in Italy came from the fees for student examinations. At 15 lire per student, and the lire worth some 19 cents, the result was something; with the lire now worth 1/6th of a cent and the fee still 15 lire, it is a different story. Twenty of these oral examinations of half an hour or more each will buy a package of good (but not the best) cigarettes or, to be more frugal, a couple of loaves of bread and a bit of cheese. In Naples I found not a single faculty member who lived -- or could live -- on his salary. But the universities keep on growing in numbers of students if not in finance. Last year the enrollment at Naples was 31,178, the majority being in the professional faculties -- 4,622 in medicine (six years, including some of what we call pre-medical work), and 7,180 in the law school.

On the way back from Naples we stopped for a while in Paris, long enough to see that the university problem of too many students and too little money is almost as bad there as in Italy. Teaching in clinical medicine in Paris attracts able men because, as in other regions, the prestige of a professorship carries various rewards, including big private fees. But the pre-clinical subjects, and all research, have a rough time. The national laboratories and institutes have better support but they involve few workers. It is all too bad because there are many Frenchmen who, with their analytical minds and fertile imaginations, could make first-rate contributions to the advance of knowledge if they had the time and facilities for systematic work. As one discerning Swede said to me, the French medical journals are full of bright ideas and no facts -- while in the States the reverse may be true. Or, as a Dutch friend said, the typical French paper attempts to develop significant ideas from statistically insignificant data and the American counterpart is occupied with showing statistical significance where there is only biological triviality. Nevertheless, it is generally agreed over here that American research is leading the world in a number of fields, including biochemistry, applied pharmacology, some branches of psychology and, probably, clinical physiology.

Here in Oxford all types of research and scholarship are represented, though there is some reluctance to admit that medical scientists are true scholars. But Dons, students and townsmen alike are currently united in several interests: the outcome of the Oxford-Cambridge boat race (Saturday), the new National Budget, and the contest between Taft and Eisenhower for the Presidency. Minnesota's performance in the Republican primary, I find, has made a lot of people rush to their atlases to find out where Minnesota is; I even detect a new interest when I am introduced as the professor from Minnesota.

As for me, I have two lectures coming up in London and another in Belfast before we set off, on May second, for another go at field research, this time in Madrid. The children are home today for the Easter vacation from their schools and they are busy challenging one another -- and their parents -- with newly learned Latin and French words, interspersed with long tales of hockey matches and dramatic competitions. This does not help me in my efforts to find out about the adjudication of increased funds for the payment of doctors in the general panels. I gather that this last means there will be some tidy payments going out to the general practitioners who have been howling about unfair treatment. I shall learn more tomorrow at the meeting of the Physiological Society. Incidentally, most of the professional societies meet once a month here, except in summer, so people get to know one another pretty well. And I, being interested in several fields, could spend all my time at meetings if I did not watch out.

With all the best to our friends in the area reached by The Journal-Lancet,

As ever,

Ancel Keys

Meet Our Contributors . . .

Spencer F. Brown was graduated from the University of Minnesota in 1946, took advanced training in pediatrics at Johns Hopkins and Minnesota, is now instructor in pediatrics at the latter school. He is chief of pediatrics at Minneapolis General hospital and Elizabeth Kenny Institute; consultant in speech pathology, Minneapolis Veterans hospital.

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Angus L. Cameron was graduated from Rush Medical college in 1916, has practiced surgery at the Northwest Clinic, Minot, North Dakota for 27 years. He is a consultant in general surgery at the North Dakota State Tuberculosis sanatorium and the Veterans Administration hospital in Minot. He serves as first vice president of the Western Surgical Association.

★

Harold W. Dargeon was graduated from Albany Medical college in 1922, practices as a pediatrician in New York City, is attending pediatrician at St. Luke's hospital. He has taught pediatrics at Columbia and Cornell University medical colleges.

★

Rudolf Engel received medical degrees from the University of Bonn and from the University of Minnesota, is now medical director of the Minnesota Home and School for Epileptics at Cambridge, Minnesota. He holds membership in the American Branch of the International League Against Epilepsy, the Northwest Pediatric Society, and the Association of Electroencephalographers.

★

Franz Halberg was graduated from the University of Klausenburg in 1943, took graduate work at Harvard, is now on the staff of the department of physiology of the University of Minnesota, and serves as consultant to the Cambridge State School and Hospital.

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Warren Lowell Macaulay was graduated from the University of Minnesota medical school in 1942, serves on the staff of Fargo Clinic, St. Luke's and St. John's hospitals in Fargo, North Dakota, where he specializes in dermatology.

★

Robert C. Lam is a graduate of Peiping Union Medical College in 1949, took surgical residencies at Asbury hospital in Minneapolis and St. Mary's hospital, Grand Rapids, Michigan, is chief of surgery and medical officer in charge of the Pine Ridge Hospital at Pine Ridge, South Dakota.

George W. Lund was graduated from the University of Minnesota medical school in 1946, specializes in pediatrics, in Minneapolis, is clinical instructor at the University of Minnesota hospitals.

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Bernard A. Mazur is a graduate of the University of Buffalo medical school, specializes in pediatrics at the Dakota Clinic, Fargo, North Dakota. He is a fellow of the American Academy of Pediatrics, a member of the Northwest Pediatric Society and president of the North Dakota Pediatric Society. He is on the staff of St. John's and St. Luke's hospitals at Fargo.

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James W. McGill was graduated from the medical school of St. Louis University in 1925, specializes in obstetrics and gynecology in Superior, Wisconsin where he is chief of staff at St. Francis hospital and chief of obstetrics department at St. Mary's hospital. He holds memberships in the American College of Surgeons, Wisconsin Surgical Society, and several specialist groups.

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★

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★

Mildred R. Ziegler received her Ph.D. from Yale in 1923, specializes in biochemistry, serves as assistant professor of pediatrics at the University of Minnesota. She is a member of the Northwest Pediatric Society and Society for Experimental Biology and Medicine. She is the recipient of several research awards, and is the author of numerous scientific papers.

Lancet Editorial

ROENTGEN THERAPY FOR LIP CANCER

Eradication of the local lesion in lip cancer should be treated as a separate problem from that of possible or actual metastasis. It is best accomplished by treatment which is reliably curative and at the same time the least disfiguring and disturbing in all respects. Of course, undue emphasis should not be placed on these latter objectives at least when it means jeopardizing the chances for a cure. But good cosmetic and functional results deserve the best efforts of attainment consistent with the primary objective. Lip cancer patients oftentimes are so intent upon their appearance after treatment that they do foolish and dangerous things by listening to the assurances of quacks who are thoroughly aware of their fears in this regard and know how to play on them to their own advantage. A serious public health problem is thus created by the large number of people who fall into the hands of unorthodox and unreliable practitioners promising cures without operations and also without the scarring and deformity sometimes caused by excision.

This problem in all its aspects can best be solved by the employment of roentgen therapy for the local lesion in most instances.

It must be admitted that excision provides as sure a way as is known of effecting a local cure and that it is still the procedure of choice in a small percentage of long neglected cases which experience has proved to be refractory to roentgen therapy.

In a large percentage of cases, however, roentgen therapy has long been known to be as reliable as is surgical excision in the cure of the local growth. This is true for practically all cases in which a V-shaped excision is indicated in a surgical sense—whatever its width.

The incomparable advantage of roentgen therapy is its selective action on cancer cells. In most instances, when properly given, it destroys them without appreciable damage to adjacent tissue in the lip. Because of this magical quality, so to speak, the highly objectionable sequellae of scarring, deformity and impairment of function of the lip which may follow surgical excision are quite consistently eliminated by roentgen therapy when sufficient care is observed in giving it. This consists of the administration of enough radiation to cure the lesion, without using all that normal tissue will tolerate. The dose is usually divided into daily treatments for a period of several days.

Compared with surgical procedures this kind of radiation therapy is much simpler in its application since it requires no hospitalization or operating room services.

Postradiation reactions are well tolerated and seldom interfere with the patient's usual activity. They reach their height as a rule two weeks after treatment. In the more favorable cases and in most that are seen in this region the tumors and the reactions have disappeared completely at the end of six or seven weeks.

Despite all of these distinct advantages of roentgen over surgical therapy for the local lesion in most cases of lip cancer, they have failed to win it any noteworthy support with many practitioners who still rely regularly upon excision of the primary growth. As long as this attitude continues to be prevalent, discussions in favor of roentgen therapy for most local lesions in lip cancer will be in order.

Angus L. Cameron, M.D.,
Northwest Clinic, Minot, North Dakota

Program of the Sixty-fifth Annual Meeting of the North Dakota State Medical Association

GARDNER HOTEL, FARGO, NORTH DAKOTA

May 10, 11, 12 and 13, 1952

SATURDAY, MAY 10—

Meeting of the House of Delegates and the Council of the Association.

SUNDAY, MAY 11—

Second session of the House of Delegates and the Council of the Association. 6:00 p.m.—Mixer, for doctors and their wives, Moorhead Country Club.

MONDAY, MAY 12—

8:30–9:30 a.m.—Registration and view exhibits.

9:30–10:00 a.m.—*Results of Miniature Chest Survey in North Dakota,* by Dr. H. M. Berg, radiologist, Quain and Ramstad Clinic, Bismarck, North Dakota.

10:00–10:30 a.m.—*X-ray Diagnosis of Ulcerating Lesions of the Stomach,* by Dr. Harold O. Peterson, Miller Hospital, St. Paul, Minnesota.

10:30–11:00 a.m.—Intermission and view exhibits.

11:00–11:30 a.m. — *Common Causes of Hematuria and Their Treatment,* by Dr. Frederick F. B. Foley, 228 Lowry Building, St. Paul, Minnesota.

11:30–12:00 a.m. — *Common Problems in Office Gynecology,* by Dr. John A. Haugen, 100 East Franklin, Minneapolis, Minnesota.

2:00–2:30 p.m.—*Newer Concepts in the Treatment of Infectious Diseases in Children,* by Dr. Franklin Top, Pediatric Department, University of Minnesota Hospitals, Minneapolis, Minnesota.

2:30–3:00 p.m. — *Small Bowel Tumors,* by Dr. Robert F. Nuessle, Quain and Ramstad Clinic, Bismarck, North Dakota.

3:00–3:30 p.m.—Intermission and view exhibits.

3:30–4:00 p.m. — *Management of the Cross-eyed Child,* by Dr. T. G. Martens, Mayo Clinic, Rochester, Minnesota.

4:00–5:00 p.m.—Fracture Clinic—Dr. E. C. Henrikson, 407 Doctors Bldg., Minneapolis, Minnesota; Dr. Daniel Moos, Medical Arts Bldg., Minneapolis, Minnesota; Dr. M. C. Nelson, Medical Arts Bldg., Minneapolis, Minnesota.

MONDAY, MAY 12—

8:00 p.m.—Special Concert, Fargo-Moorhead Symphony Orchestra. Guest Artist, Rafael Druian, Concertmaster of the Minneapolis Symphony Orchestra. (For doctors and their wives, guests, guest speakers, etc.)

TUESDAY, MAY 13—

9:00–9:30 a.m.—*Salient Points of an Autopsy,* by Dr. James D. Cardy, Grand Forks, North Dakota.

9:30–10:00 a.m.—*Management of Bleeding Lesions of the Digestive Tract,* by Dr. J. A. Bargen, Rochester, Minnesota.

10:00–10:30 a.m.—*Diagnosis and Treatment of Benign and Border-line Breast Lesions,* by Dr. O. J. Campbell, Minneapolis, Minnesota.

10:30–11:00 a.m.—Intermission and view exhibits.

11:00–11:30 a.m.—*The Blood Pressure Problem,* by Dr. Edward L. Bortz, Philadelphia, Pennsylvania.

2:00–2:45 p.m.—*Presidential Address,* by Dr. W. E. G. Lancaster, Fargo, North Dakota. *Inaugural Address,* by Dr. O. W. Johnson, Rugby, North Dakota.

2:45–3:15 p.m.—*Recent Advances in the Diagnosis and Treatment of Diseases of the Thyroid,* by Dr. Ray F. Farquharson, Toronto, Canada.

3:15–3:30 p.m.—Intermission and view exhibits.

3:30–4:30 p.m.—A Panel Discussion on *The Clinical Problem of Jaundice,* by Dr. Ray F. Farquharson, Moderator; Dr. O. J. Campbell, Dr. J. A. Bargen, Dr. James D. Cardy.

4:45 p.m.—Drawing for Door Prize.

5:00 p.m.—Smorgasbord, Fargo Country Club, for doctors and exhibitors.

SPECIAL LUNCHEONS

MONDAY, MAY 12

(1) 12:30 p.m. — Elks Club — North Dakota Radiological Society. Guest speaker, Dr. Harold O. Peterson, St. Paul.

(2) 12:30 p.m.—Colonial Room, Gardner Hotel—North Dakota Eye, Ear, Nose and Throat Society. Guest speaker, Dr. T. G. Martens, Rochester, Minnesota, will speak on *Problems of Presbyopia.*

(3) 12:30 p.m.—South Room, Gardner Hotel—North Dakota Society of Obstetrics and Gynecology. Guest speaker, Dr. John A. Haugen, Minneapolis, Minnesota.

(4) 12:30 p.m.—Parlors B and C, Gardner Hotel—North Dakota Pediatric Society. Guest speaker, Dr. Franklin Top, Minneapolis, Minnesota.

(5) 12:30 p.m. — East Room, Gardner Hotel — The Dakota-Manitoba Urologic Society. Guest speaker, Dr. Frederick F. B. Foley, St. Paul, Minnesota.

TUESDAY, MAY 13—

(1) 12:30 p.m. — Colonial Room, Gardner Hotel — North Dakota Diabetic Association. Guest speaker, Dr. Edward L. Bortz, Philadelphia, Pennsylvania, member of the Council of the American Diabetic Association.

BOOK REVIEWS

Understanding Children's Play, by Ruth E. Hartley, Lawrence K. Frank and Robert N. Goldenson, 1952. New York: Columbia University Press. $3.50.

This book presents play experiences of children within the framework of living problems, and is designed to give the adults who help shape their lives, a fuller understanding of the significance of children's play. It offers valuable aids in fostering the development of productive, well-integrated human beings.

It contains chapters on the functions of play in the child's development, dramatic play, block play, water-play, clay, the use of graphic materials, finger painting, music and movement. An appendix contains suggestions for observing and recording play activities of children, and a bibliography of reference material and an index are included.

Published in conjunction with *Understanding Children's Play* are two booklets, available from Columbia University Press at 75 cents per copy, containing additional material derived from the original study. *New Play Experiences for Children*, by Hartley, Frank and Goldenson, presents the records and results of exploration with new play methods and media. Play groups were set up in accordance with the emotional needs of the child. Exploratory work with miniature life toys and puppet plays indicated that they hold considerable promise for understanding and helping the child.

"Teddy and Budd — Growing Through Play," by Ruth E. Hartley, is in effect a case study of two boys whose play record revealed different problems of adjustment to themselves and to their teachers. The booklet brings out clearly how their problems are revealed in their approach to various play activities. Accompanying comments suggest methods of observing such activities in a fruitful way.

•

Why Children Misbehave, by Charles W. Leonard, 1952. Chicago, Illinois: Science Research Associates. 49 pages. 40 cents.

The author, Charles W. Leonard, is superintendent of the Illinois State Training School for Boys. He believes that the standards adults have set up for children's behavior are unrealistic. Much of what is commonly judged misbehavior is normal in growing up. We will be more reasonable in imposing restraints, in handling misbehavior and helping children create their own inner controls, if we can understand why a child acts as he does.

•

Fluid Balance, by Carl A. Moyer, M.D., 1952. Year Book Publishers, Inc. 191 pages. $3.75.

This little manual fills a very definite and hitherto empty niche in the practicing surgeon's library as well as that of the surgical resident, for whom it was especially written. Most valuable is Chapter IX, which contains case reports illustrating both the pitfalls and triumphs of fluid therapy. This chapter provides a special incentive for careful perusal of the remaining text. Practical methods of diagnosis of fluid imbalance are outlined including aspects of the history and physical examination, as well as laboratory tests, almost all of which are everyday routines in most hospitals. In this regard such common denominators as urine specific gravity, hemoglobin, carbon dioxide combining power, and serum chlorides are stressed. The concepts of extracellular fluid volume as well as electrolyte concentration are well described to provide the basis for a rational, undertandable approach to fluid therapy.

A.W.I.

•

Growing in the Older Years, edited by Wilma Donahue and Clark Tibbett, 1951. Ann Arbor, Michigan: University of Michigan Press. 204 pages. $2.50.

"Growing in the Older Years" is a good source book of information. It is a collection of papers on various topics, all vital to the study and understanding of the problems which older people have to meet. The papers are chosen and combined to provide a rounded discussion of important issues. However, because it is a collection of papers, there is considerable repetition and the topics are highlighted. The full strength of a book written by one person who has grappled with the problem, is missing.

The chapter by Clark Tibbetts gives a comprehensive view of the national aspects of aging. His discussion contains all the figures and statistical data essential to the treatment, understanding, and evaluation of the present day situation of old people. The problems are concisely and clearly stated.

One of the most valuable chapters for anyone living or working with older people, is the paper by Jack Weinberg, M.D., on the "Psychiatric Techniques in the Treatment of Older People." This contains simple direct suggestions to relatives and workers. Describing senescence, he says: "The most outstanding characteristic of senescence which threatens emotional health, are the decline, loss of erotic values (attractiveness) loss of supporting figures (family and friends), social and economic insecurity, and the gradual contraction in the flexibility and plasticity of the adaptive mechanisms."

To counteract these factors he suggests the following measures: (1) allow the aged person to express himself; (2) allay the anxiety and insecurity by the strength that can be brought to the situation; (3) help older people into activities which will tend to enhance their attractiveness physically and otherwise, (4) plan with them, and not for their daily activity when life becomes empty; and (5) bring an optimistic attitude.

The discussion of the "Physical Restoration and Older Persons" by Michael M. Daseo, M.D., gives the theory of physical rehabilitation for older people. He considers chronic diseases, physiological aging, the most prevalent illnesses, and training for the activities of daily living.

"The Training of Volunteers in Community Service with Older People," by Miss Ollie Randall, offers valuable material, with practical procedures for development and organization of volunteer services.

"Growing in the Older Years" is an excellent source book and would be especially helpful to doctors, nurses, clergymen, educators, and social workers. In spite of its multiple authors, it is an interesting, easy to read, and enjoyable book.

A.L.B.

News Briefs . . .

North Dakota

Bids for construction of an addition to the University of North Dakota medical building were opened on March 15 by university officials. The bids were to be studied by the state board of higher education at a meeting in Bismarck during the following week.

* * *

Harvey will have a new medical center with complete diagnostic facilities as soon as the present expansion program has been completed by Dr. A. F. Hammargren and Dr. Charles Beck Jr. Space will be provided for a staff of five doctors, x-ray equipment, laboratory facilities and an optical room.

* * *

Strengthening of the present two-year medical course at the University of North Dakota medical school before embarking on a four-year course was recommended in a report released April 5 by Dr. Harold C. Lueth, dean of the University of Nebraska college of medicine and Robert C. Lewis, dean of the University of Colorado school of medicine. They were asked to make a survey of the state facilities by the North Dakota medical center advisory council in January 1951. Participating in the survey were Dean John W. School of the University of Alberta faculty of medicine and Dr. Theodore H. Harwood, assistant dean of medicine at the University of Vermont.

One of the recommendations was that immediate steps be taken to construct the new wing of the medical building, and provide necessary staff and equipment to furnish adequate instruction. It was also recommended that the four-year course be delayed until the new construction was completed and sufficient time had elapsed for a reliable trial of the success of sophomore clinical teaching in the several medical centers.

* * *

Dr. L. W. Larson of the Quain and Ramstad clinic at Bismarck will be one of the American delegates to a conference of the World Health Organization in Geneva, Switzerland May 5. His appointment to the American delegation was made by the United States state department.

* * *

Dr. Roland W. Hipsley, head surgeon during the war for the North Burma command, has been named new manager for the Minot veterans administration hospital. He will succeed the present manager, Dr. John B. McHugh, who has been appointed manager of a new 500 bed VA hospital in Kansas City. Dr. Hipsley has been chief surgeon at the Minot hospital since May 1950. He will continue in this role besides holding the positions of manager and chief of pressional services. Dr. Hipsley is a 1925 graduate of Western Reserve university medical school and took postgraduate work at Lakeside hospital in Cleveland and at New York hospital.

* * *

Dr. F. E. Donoghue and Dr. A. B. Hagedorn of the Mayo Clinic were speakers at the cancer seminar held April 26 at the Dacotah Hotel in Grand Forks. The seminar was under the auspices of the North Dakota Cancer society and the Grand Forks District Medical society.

Minnesota

Dr. E. T. Bell, professor emeritus of pathology at the University of Minnesota, is winner of the 1952 medal for outstanding achievement in cancer control from the Minnesota section, American Cancer Society.

* * *

Dr. Edward H. Lambert, a member of the Mayo Clinic section of physiology, has received the International Aero Medical association's first Arnold D. Tuttle award. The award, $500 in cash and a plaque, was presented Dr. Lambert for research in connection with the effects of rapid acceleration. Dr. Lambert is the author of three papers recently published in the association's journal.

* * *

Dr. Christopher Graham, only living member of the original Mayo Clinic staff, observed his 96th birthday April 3, by reading greetings sent by patients and medical associations from all over the world. Dr. Graham, first intern at St. Mary's hospital, was head of the clinic's division of medicine when he retired in 1919.

* * *

Dr. John Carlson was elected Westbrook's "Best Citizen" in an election conducted by the *Westbrook Sentinel.*

* * *

Dr. C. J. Watson, head of the department of medicine, University of Minnesota, discussed "The Problem of Dissociation of Impairment of Liver Function in Liver disease" at a seminar sponsored by the Upjohn Pharmaceutical Company at Kalamazoo, Michigan, on March 13. On March 17 he delivered the annual Alpha Omega Alpha address at Temple University, Philadelphia.

* * *

Dr. Charles D. May, associate professor of pediatrics, University of Minnesota, will assume a new position as professor and head of the department of pediatrics at the medical college of the State University of Iowa in Iowa City.

* * *

Dr. J. L. Bader, a graduate of the University of Nebraska medical college, will join the staff of the Slayton Clinic on the first of July.

* * *

Dr. Francis Swain, a graduate of the University of Louisville school of medicine, will join the staff of the new Oxboro clinic as a specialist in obstetrics and gynecology.

* * *

Dr. M. G. Oppen and Dr. Roger S. Johnson, both 1950 graduates of the University of Minnesota medical school, have established offices at Deephaven.

South Dakota

Approximately 150 doctors attended the fifty-sixth annual meeting of the Sioux Valley Medical Association held at Sioux Falls on February 26 to 28.

* * *

A school of medical technology will be opened soon at St. John's McNamara Hospital in Rapid City. Approval of the school has been received from the American Medical Association and the American Society of Clinical Pathology. Classes will continue for twelve months and graduates will be eligible for examination for registered medical technologists. Graduates may also earn their bachelor of science degree if they have completed three years of college, including certain prerequisite courses.

The new Leola Community hospital will be ready for use very soon. Dr. J. F. Malloy will head the medical staff.

* * *

Dr. Carl J. Bridge, a graduate of the University of Wisconsin medical school, has opened an office in Beresford. He left Canova, where he had been practicing, because of the closing of the hospital.

* * *

Dr. O. M. Storsteen, a graduate of the University of Nebraska medical school, will join the staff of the Tekakwitha clinic and hospital.

* * *

Dr. Chester A. Clark, a graduate of the Northwestern University medical school, has been named to the staff of the Homestake Hospital at Lead. Dr. Clark has practiced at Winner for the past three years.

* * *

Dr. Maynard H. Porter of Yankton has joined Dr. William F. Bollinger in practice at Parkston. Dr. Porter is a graduate of the University of Nebraska school of medicine.

* * *

The residents of Willow Lake have appealed to Governor Sigurd Anderson for aid in securing a doctor for their town of 404 population.

Wisconsin

The new Tomah Memorial Hospital held open house for 4,000 visitors on Sunday, March 16. The hospital will be open for patients just as soon as complete equipment has been received.

* * *

Dr. John A. Grab, Madison, was elected president of the Madison area chapter of the Academy of General Practice at their annual meeting in the Park hotel. Other officers named are Dr. R. F. Collins, Madison, president-elect; Dr. R. J. Nerein, Madison, secretary, and Dr. Louis Fauerbach, treasurer.

* * *

Dr. William D. Frost, emeritus professor of bacteriology at the University of Wisconsin, has retired as president of Morningside Sanatorium at Madison after 43 years of service on the board of directors. Dr. Frost, who is 84, will remain as consultant to the medical director at Morningside.

* * *

Dr. John Hogan, of Pepin, will move soon to Bigstone Gaps and Appalachie, Virginia, to continue in industrial and private practice.

Iowa

Iowa City's new ten million dollar Veterans hospital received its first patient on March 3 and will be operating at full capacity of 500 patients, 600 staff members, just as soon as equipment and personnel are ready. Dedication services were held Sunday, March 16. The manager of the hospital is Dr. Leland E. Stilwell, who came to Iowa City from Jefferson Barracks, Missouri, where he had been clinical director and chief of professional services at the Veterans Administration hospital for six years.

* * *

Dr. T. D. Clark of Victor left early in March to assume his new federal appointment to the clinical staff of the Veterans hospital at Knoxville, Tennessee.

* * *

Dr. Edward R. Woodward, formerly of Mason City and now instructor in surgery at the University of Chicago was one of twenty-one winners of awards amounting to $30,000 from the John and Mary R. Markle Foundation. Awards are paid $6000 annually for a period of five years.

* * *

Dr. J. W. Presnell is retiring after nearly 60 years of practice in Scranton.

Deaths . . .

Dr. Norman Marshall Smith, 76, Minneapolis, died on February 23. A graduate of Hahnemann Medical college, Chicago, Dr. Smith had practiced medicine for 50 years.

* * *

Dr. N. O. Ramstad, pioneer Bismarck physician, died February 25 at St. Petersburg, Florida. Dr. Ramstad was a co-founder of the Quain and Ramstad Clinic in Bismarck, North Dakota.

* * *

Dr. Frederick N. Burrows, Grand Forks, North Dakota, died February 20, at the age of 96. He was licensed to practice medicine in Dakota Territory by the Territorial Board of Medical Examiners, and was a member of the first North Dakota State Board of Medical Examiners.

* * *

Dr. Leonard L. Peterson, who practiced in Rochester from 1939 to 1942, died on February 26 in Brooten, Minnesota.

* * *

Dr. C. A. Real, 70, a practicing physician at Cando, North Dakota, died on March 5 at Jamestown.

* * *

Dr. William L. Palmer, 84, Albert Lea physician, died at Naeve hospital on March 8, after an illness of three years. A graduate of the Rush Medical college, Chicago, he was one of the founders of the Albert Lea medical and surgical center in 1940.

* * *

Dr. Werner Hemstead, 91, veteran Minnesota physician, died at Rochester, Minnesota, on March 12. A graduate of the first graduating class of the University of Nebraska medical school, he practiced at Brainerd, St. Cloud, and Fergus Falls.

* * *

Dr. Earl L. Sharp, 63, who was clinical director of the Veterans hospital at St. Cloud, Minnesota until his retirement several months ago, died March 15 at Fort Snelling Veterans hospital.

* * *

Dr. Robert J. Hodapp, who had practiced at Willmar, Minnesota for more than 30 years, died suddenly on March 17. Dr. Hodapp was a graduate of the University of Minnesota medical school.

* * *

Dr. Lillie Rosa Minoka-Hill, 75, Indian physician who won national recognition for her work among Wisconsin's Oneida Indians for 44 years, died March 18 at Oneida, Wisconsin.

* * *

Dr. George C. Hanson, who conducted an eye, ear, nose and throat practice in Minot for more than 33 years before moving west in 1949, died March 19 in Seattle.

* * *

Dr. Ward Akester, 71, who practiced in Marshall, Minnesota for many years, died on March 27 at Minneapolis Veterans hospital. In recent years he had served at the Fergus Falls, Minnesota state hospital and the Mt. Pleasant, Iowa, state hospital.

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1. Stritzler, C.; Fishman, I. M., and Laurens, S.: *Transactions New York Acad. Sc., 13:*31, Nov., 1950.

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American College Health Association News

This article is being written two and a half weeks previous to the thirtieth annual meeting of the Association. It is our hope, at time of publication, that many of you will have been in attendance and that valuable information has been obtained, either from the speakers on the program or from conversation with individuals. The next issue of The Journal-Lancet will give a report of some of the highlights of the meeting.

* * *

The fourteenth annual meeting of the North Central Section was held in Minneapolis, Minnesota, on October 8 and 9, 1951. Fifty-one representatives from twenty-six colleges and universities and one foreign visitor from Cambridge University, England were in attendance.

The program, which was arranged by Dr. Ruth Boynton and Dr. Don Cowan of the Student Health Service of the University of Minnesota, included papers and discussion on psychotherapy, teaching of health to college students, prevention and care of athletic injuries, chest diseases in college students, present status of antibiotic therapy and problems of the small health service.

The new officers of the Section are: President—Dr. Ray Rueckert, University of Wisconsin; vice-president—Dr. Donald Cowan, University of Minnesota; secretary-treasurer—Dr. Lois Boulware, University of Iowa; executive committee—Dr. D. H. Peterson, St. Olaf College and Marjorie McGrath, R.N., LaCrosse State Teachers College.

The next meeting will be held in Northfield, Minnesota, with St. Olaf and Carleton colleges acting as joint hosts.

* * *

Five institutions have applied for membership in the Association as follows:

Southern Illinois University, Carbondale, Illinois, a state institution with an enrollment of 2,160 men and 1,098 women. Dr. R. W. Bradshaw, the college physician, is a member of the Council of the American College Health Association and formerly the college physician at Oberlin College. The staff consists of two full time physicians, five full time and two part time nurses, a laboratory technician, a sanitarian, and a health educator.

Oklahoma City University, Oklahoma City, Oklahoma, with an enrollment of 1,357 men and 356 women. Mrs. Lucy Myers, R.N., is the director of the Student Health Center. Three part time physicians and one full time and one part time nurse constitute the staff of the department.

Mississippi State College, State College, Mississippi, with an enrollment of 1,815 men and 1,212 women. The staff consists of Dr. J. C. Longest, director of the Student Health Service, two full time nurses, and a registered technician.

State Teachers College, Brockport, New York, with an enrollment of 532 men and 611 women. Ernest Tuttle, M.Ed., is the director of the Department of Health and Physical Education and William A. Stebbins is the health educator. The health service staff includes Alexander Walker, M.D., the college physician, and one full time and one part time nurse.

Wilson Teachers College, Washington 9, D.C., a municipal college with an enrollment of 183 men and 243 women. Walter E. Hager, Ph.D., is the director and Philip Fox is the health educator. The health service staff includes one part time physician and one full time nurse.

AGENESIS OF ANUS AND RECTUM

(Continued from page 239)

BERMAN, J. H.: Congenital anomalies of the rectum and anus. Surg., Gynec. & Obst. 66:11, 1938.

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MAYO, C. W. and RICE, R. G.: Anorectal anomalies, a statistical study of 165 cases with special reference to "distal-loop trouble." Surgery 27:485, 1950.

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ENCEPHALOPATHY FOLLOWING PERTUSSIS VACCINE

(Continued from page 251)

cination, the frequency of severe permanent damage to the brain has been higher and the immediate mortality less. The mortality rate of pertussis in young infants is still high and protection so well established that the remote risk of encephalitis should not curtail use of the vaccine.

Of course, certain precautionary measures are indicated. If severe reactions occur following administration, and particularly if there are any reasons to suspect any cerebral injury, further doses should be withheld. It should not be given to children with acute illness or fever. All such reactions should be observed and recorded so as to furnish information as to incidents, nature and possible predisposing factors involved.

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Surgical Technic, Surgical Anatomy and Clinical Surgery, Four Weeks, starting June 2, September 8.
Surgical Anatomy and Clinical Surgery, Two Weeks, starting June 16, September 22.
Surgery of Colon and Rectum, One Week, starting May 12, June 2.
Gallbladder Surgery, Ten Hours, starting June 16.
Basic Principles in General Surgery, Two Weeks, starting September 8.
General Surgery, One Week, starting May 12, October 6.
Breast and Thyroid Surgery, One Week, starting June 23.
Esophageal Surgery, One Week, starting June 23.
Thoracic Surgery, One Week, starting June 2.
Fractures and Traumatic Surgery, Two Weeks, starting June 16.
GYNECOLOGY Intensive Course, Two Weeks, starting June 16. — Vaginal Approach to Pelvic Surgery, One Week, starting June 9, September 22.
OBSTETRICS — Intensive Course, Two Weeks, starting June 2, September 29.
PEDIATRICS—Informal Clinical Course every two weeks. Cerebral Palsy, Two Weeks, starting July 7.
MEDICINE—
Electrocardiography and Heart Disease, Two Weeks, starting July 14.
Gastroenterology, Two Weeks, starting May 19.
Hematology, One Week, starting June 16.
Gastroscopy and Gastroenterology, One Week Advanced Course, June 23.
CYSTOSCOPY—Ten Day Practical Course starting May 26, June 9, July 7.
DERMATOLOGY—Intensive Course, Two Weeks, starting October 13.

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International Meetings

Congress of the International Diabetes Federation, Leyden, Netherlands, July 7-12. Dr. F. Gerritzen, 33, Prinsegracht, The Hague, Netherlands, Secretary.

European Congress of Cardiology, University of London, Bloomsbury, W.C.1, England, Sept. 10-12. Dr. K. Shirley Smith, 35 Wimpole St., London, W.1, England, Secretary.

European Society of Cardiovascular Surgery, Strasbourg, France, Oct. 3-4. Sir James Learmonth, Department of Surgery, University New Buildings, Edinburgh 8, Scotland.

Interamerican Cardiological Congress, Buenos Aires, Argentina, Aug. 31-Sept. 7. Dr. Blas Moia, Larrea 1132, Buenos Aires, Argentina, Secretary-General.

International College of Surgeons, Madrid, Spain, May 20-24. Dr. Max Thorek, 850 West Irving Park Road, Chicago, Ill., U. S. A., Secretary-General.

International Congress of Dermatology and Syphilology, London, England, July 21-26. Dr. Gordon B. Mitchell-Heggs, 5, Lisle St., London, W.C.2, England, General Secretary.

International Congress on Diabetes, Leyden, The Netherlands, July 7-12. Dr. F. Gerritzen, 33, Prinsegracht, The Hague, The Hague, Netherlands.

International Congress of Haematology, Mar del Plata, Argentina, Sept. 21-26. Dr. Carlos Reussi, Anchorena 1710, Buenos Aires, Argentina, Secretary.

International Congress of Internal Medicine, Friends House, London, N.W.1, Eng. Sept. 15-18. Sir Harold Boldero, 12 Pall Mall East, London, S.W.1, England, Secretary.

International Congress on Neuropathology, Rome, Italy, Sept. 8-13. Dr. Armando Ferraro, 722 W. 168th St., New York, N. Y., U. S. A., Secretary General.

International Congress of Physical Medicine, London, England, July 14-19. Dr. A. C. Boyle, 45, Lincoln's Inn Fields, London, W.C.2, England, Hon. Secretary.

International Union Against Tuberculosis, Rio de Janeiro, Brazil, Aug. 24-27. Prof. Etienne Bernard, 66 Blvd. St. Michel, Paris 6e, France, Secretary-General.

A FATAL CASE OF DIPHTHERIA COMPLICATED BY MYOCARDITIS AND PLEURAL EFFUSION

(Continued from page 255)

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The Journal Lancet

SERVING THE MEDICAL PROFESSION OF MINNESOTA,
NORTH DAKOTA, SOUTH DAKOTA AND MONTANA

A New Academy of Obstetrics and Gynecology . . .

WE BELIEVE that a brief account of the new American Academy of Obstetrics and Gynecology, which held its first annual meeting during the recent American Congress on Obstetrics and Gynecology in Cincinnati, is particularly appropriate to this special issue of THE JOURNAL-LANCET.

Including members from all of the United States and Canada, it is the first organization to represent the specialty on so broad a scale. Organization was begun in May 1950 at the time of the International Congress on Obstetrics and Gynecology in New York City, and is an outgrowth of the Federation of Obstetrical and Gynecological Societies, which in turn was an organization fostered by the American Committee on Maternal Welfare.

Headed by the usual national officers, the Academy is composed of eight districts, each divided into sections, with a section to be established in each state and territory of the United States and in each province of Canada. Each section is headed by a chairman, but in addition is permitted to elect other officers and adopt its own by-laws and regulations and levy assessments not in conflict with those of the Academy. Thus local societies will retain their identity and will continue to function as before.

Membership in the Academy is open to any physician who has graduated from an acceptable medical school, who is a member of the American or Canadian Medical Association and who has had a minimum of five years' training or practice limited to obsetrics and gynecology.

National pathological registries will be supported, and other elements of maternal and newborn welfare will be encouraged and supported. The formation of the American Academy of Obstetrics and Gynecology is a great step forward, for it will serve as a medium through which obstetrics and gynecologic thinking will be raised from a regional to a continental level.

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Education for Childbirth in Private Practice

A Report on 585 Consecutive Cases

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In the past five years there has been a decided trend in American obstetrical practice to consider the emotional as well as the physical aspects of childbearing. The importance of the mother having a satisfying emotional experience at childbirth is also being recognized by pediatricians and psychiatrists.[1] It is felt that in a training program for expectant mothers emotional enlightenment as well as physical training is essential. Obstetricians have delivered millions of babies with attention focused primarily on the pelvic organs, forgetting, for all practical purposes, the important cephalic anatomy and physiology at the other end of the table.

Many obstetricians in the past, including Dr. Joseph De Lee, have tried to keep surgical procedures and analgesia at a minimum, but it took Dr. Grantly Dick Read to swing the pendulum from excessive narcosis and anesthesia to a more normal type of care. Many of us may have had the idea of helping expectant mothers by some sort of education but we lacked the ingenuity to think of classes and exercises. Finding that use of a book called *Expectant Motherhood*, by Nicholson J. Eastman, M.D. of Johns Hopkins Hospital made patients more cooperative in childbirth, we were very receptive to Dr. Read's book *Childbirth Without Fear*, when it appeared in 1947. Soon after that, a few patients began asking for a chance to try the method. Results were excellent, but it was felt that patients really needed class work and support in labor such as that being used at Yale,[2] and it was arranged in 1950 for a nurse, Miss Dorothy Bell, to go to Grace New Haven Community Hospital for a three months' course in the technique. Class work began in November 1950 and statistical study was begun on January 1, 1951. The 585 cases reported are consecutive deliveries from January 1, 1951 to February 1, 1952; excepting those with less than 28 weeks gestation.

The nurse gives four two-hour classes on exercises, education, and relaxation. About twelve expectant mothers are registered as the optimum number for each class. We are now planning a fifth class to stress relaxation and to give more instruction for those wishing to breast feed their babies. Two lectures are given to mothers and fathers—one on prenatal care and delivery and the other on neonatal care. It is not considered necessary to have a psychiatrist give a lecture.

Our program differs from that at Yale in that all the babies were delivered by the authors, 90 per cent by H.L.M., and 10 per cent by F.E.F. Also, a second nurse has been added to assist with class work and support during labor. It is felt that this personal attention gives the patients a greater sense of security than being cared for by different individuals.

We have included in our classes even the patients we knew were going to have repeat cesarean sections, because we have learned that these patients have a more comfortable pregnancy and approach their surgery with a better emotional attitude.

Our results have shown steady improvement as we have learned more about the method. We ask most patients in what way they think we can improve, and have followed many suggestions. We learned rather early, for example, that too much Demerol has a tendency to cause confusion and lack of cooperation, where a smaller dose will aid in relaxation and allow better cooperation. A former nurse, whom we considered a "failure" brought this to our attention. As a result, at the present time we never use more than 50 mg. of Demerol in a single dose.

In the first three months, our primiparas averaged 11 hours in labor. Now they average a little over nine hours which includes those early ones which averaged 11 hours.

We are not going to try to evaluate the emotional and psychological improvements in the patients, nor are we going to estimate the discomfort they have had, since there is no way of scientifically or objectively measuring pain. Subjectively, as a group, these patients have had very little discomfort. We do feel that the response of the patients has been more than satisfactory, because in a private practice the success of any method can be measured only by the amount of obstetrics one continues to do. Perhaps early in the program some hesitated to come to us because of the common miscopception that "natural childbirth" means no analgesia and no anesthesia. Most of the patients say they would not want a baby any other way, and a few of the early ones are returning for care in subsequent pregnancies. We have the patients take their classes over again in repeat pregnancies because we feel they will do their exercises better if they are reminded in each pregnancy. Any patient who has returned for subsequent pregnancies has in fact asked to be able to go to the classes again.

Table I shows the total number of cases and the average number of hours of labor. At a glance, one can see the reduction in the average number of hours in labor in this method. According to Williams,[3] the average number of hours for a primipara is 16 to 18, and for a multipara about six hours less. In this series, the average for primiparas is 9 hours and 11 minutes, and for the multiparas 5 hours and 5.9 minutes.

Onset of labor has been set at the time when the patients said they began having regular contractions, no matter how far apart the regular contractions may have been. In some cases of multiparas where irregular contractions were the first sign of labor, we considered labor beginning providing the patient did go into active labor. For example, many multiparas had irregular contractions for three to five hours and then after an enema, had regular contractions and delivered. In these cases we have considered the onset of labor from the beginning of the irregular contractions. In other words, we have not let our enthusiasm for the method deter us from accurate statistics. In any case of doubt we have used the longer time interval rather than the shorter.

TABLE I

Total number of deliveries	585
Primiparas	203
Multiparas	382
Average first stage	6 hours 39.00 minutes
Average second stage	23.69 minutes
Average third stage	6.10 minutes
Total average hours in labor	7 hours 8.79 minutes

There is a surprisingly high percentage (95 per cent) of spontaneous deliveries (table II). This we feel is due to the instruction, because these patients know what is going on throughout their labors, and know what to do at the various stages.

TABLE II
Type of Delivery

	Number	Per cent
Spontaneous	554	95.20
Forceps (low)	8	1.36
Breech extractions	3	.52
Sections	20	3.41

Table III shows the number who attended classes and lectures. The initial percentage was lower, but as soon as the first few patients delivered they must have told others of the results, because now the attendance is almost one hundred per cent. At first some had to be urged, but at present most patients are eager to begin classes. Those who have several other children at home sometimes have difficulty finding the time, but we have had two mothers who have had six children at home and yet come to class. A lower percentage attend lectures because of the husbands' working hours, and because some men are shy about coming to such lectures. Those who do come are a great comfort to their wives while in labor, and also are very enthusiastic about the method.

TABLE III
Classes and Lectures (585 patients)

	Number	Per cent
Attended classes	516	88.20
Did not attend classes	69	11.62
Attended lectures	379	64.61
Did not attend lectures	206	35.38

All patients, whether they attended classes or not, received support during labor, and we feel that this support by trained personnel aids them greatly even though there has been no previous instruction. Although abdominal breathing can be taught during labor, these patients can not do it as well as those who have practiced.

We have divided the primiparas and multiparas into two groups for the remainder of the statistics. Table IV shows the type of delivery in the 382 multiparas.

TABLE IV
Multiparas (382 patients)

	Number	Per cent
Spontaneous	367	96.09
Sections	15	3.92
Forceps	0	0

The sections will be explained later. There were no forceps deliveries in this group, although Dr. Miller had delivered many of them in previous pregnancies with the use of forceps. Many of those who had had previous forceps deliveries were quite concerned about whether they could have a spontaneous delivery or not. After seeing the results, we can now quite safely assure them that they will have a normal delivery.

The short second stage (as shown in table V), indicates also that forceps certainly were not indicated to relieve pressure of the baby's head on the perineum, nor to shorten the second stage. In fact, we have to watch these patients very carefully in order to have time to scrub and drape them.

TABLE V
Duration of Labor

First stage	4 hours 48.00 minutes
Second stage	12.48 minutes
Third stage	5.43 minutes
Total Labor	5 hours 5.91 minutes

Table VI shows the number and percentage of the various positions. The only significant fact in this observation is that there is a smaller percentage of posteriors than is usually seen where other series are recorded. (See Williams' *Obstetrics*). We attribute this to the relaxation of the patient, because we have seen several posteriors rotate near the end of labor and deliver in the anterior position. We considered them to be in the anterior position if the head was delivered in this position no matter what position it may have been in during descent through the birth canal.

TABLE VI
Positions in 372 Multiparas (5 twins included)

	Number	Per cent
LOA	242	65.06
ROA	96	25.08
LOP	6	1.61
ROP	8	2.41
Breech—Footling	12	3.22
Frank	5	1.34
Transverse—Shoulder	2	.52
Hand	1	.26

In table VI we have shown the amount of medication given to the 367 multiparas who delivered spontaneously. The cesarean sections are not included in this group. In 199 cases of those who did receive Demerol, only 50 mgm. were given. This means that 80 per cent received 50 mgm. of Demerol or less. We know that many of the patients receiving 50 mgm. of Demerol could have gone without it, because in many cases they were urged to take it. We feel that 50 mgm. will help them relax better during the transitional stage.

TABLE VII
Medications in 367 Multiparas

	Number	Per cent
None	97	26.43
125 mg. or more Demerol	8	2.17
125 mg. or less Demerol	262	71.38
50 mg. only Demerol	199	54.22

Table VIII shows the amount of anesthesia given to the multiparas. The anesthetic agent used was NO_2 and O_2. We usually use an 80 per cent nitrous to 20 per cent oxygen mixture. The 367 who received whiffs were all fully conscious at all times and heard the baby's first cry. Many of those listed as having whiffs had only one to three breaths of the gas.

Partial anesthesia was considered present each time the mother was unconscious, even though it may have been only for the moment of delivery. These cases were those who asked to be asleep for the actual birth or in simple breech deliveries.

The four complete anesthetics were used for the two transverse positions in which version and extractions were done, and for two breech extractions.

TABLE VIII
Anesthesia for Multiparas (367 patients)

	Number	Patients
Whiffs	381	87.46
None	31	8.44
Partial	11	2.99
Complete	4	1.08

Table IX shows the percentage of episiotomies and lacerations. There were 42 per cent of the multiparas delivered with no episiotomies and no tear. We feel this figure is also significant in view of the short duration of the second stage. We realize that an episiotomy is better than a tear, and the reason for the 14 per cent tears is because we felt we could get by without an episiotomy, or because delivery was so rapid we did not have time to do one. A local infiltration of one per cent Novocain was used for all repairs.

TABLE IX
Episiotomies (367 multiparas)

	Number	Per cent
Episiotomies	159	43.62
Number episiotomies	156	42.56
One per cent laceration	46	12.53
Two per cent laceration	6	1.62

The type of delivery for the 203 primiparas is recorded in table X. Again, the large percentage of spontaneous deliveries is amazing.

TABLE X
Primiparas (203 patients)

	Number	Per cent
Spontaneous	190	93.59
Sections	5	2.46
Forceps (low)	8	3.94

In table XI the number of hours in labor for the 203 primiparas is presented. This excludes, of course, the five sections. Again, the short duration of the second stage is important in view of the fact that forceps were used in only 3.9 per cent of the cases. We have noticed over the past 13 months a gradual decrease in the number of hours in labor, but feel that about nine hours for a primipara is about as low as we can get.

TABLE XI

First stage	8 hours 30.00 minutes
Second stage	34.90 minutes
Third stage	6.78 minutes
Total Labor	9 hours 11.68 minutes

Table XII shows the positions, and as in the multiparas, there is nothing significant except that there are probably less posteriors than is ordinarily seen.

TABLE XII
Positions in 198 Primiparas

	Number	Per cent
LOA	122	61.66
ROA	65	32.77
LOP	5	2.52
ROP	3	1.51
Breech—Footling	2	1.01
Frank	1	.50

Table XIII shows medications for primiparas delivered from below.

TABLE XIII
Medication in 198 Primiparas

	Number	Per cent
None	12	6.06
125 mg. or less Demerol	145	73.23
125 mg. or more Demerol	41	20.70
50 mg. only Demerol	81	40.95

Only 6 per cent had no Demerol, yet 50 mg. only were given in almost 41 per cent of the cases. One certainly does not need to worry about a narcotized baby with such small amounts of Demerol. As in the multiparas, we feel that some medication helps in the transitional stage.

Table XIV shows the amount of anesthesia used in the primiparas.

TABLE XIV
Anesthesia in 198 Primiparas

	Number	Per cent
Whiffs	146	73.73
None	29	19.69
Partial	4	2.07
Complete	9	4.54

It is interesting to note that more than twice as many primiparas as multiparas go without any anesthesia. We believe this is due to the fact that multiparas have had anesthetics in previous deliveries, and consider it a necessity. Occasionally a few whiffs of gas are beneficial if for no other reason than to prevent a patient from saying (over the bridge table) that she received nothing during her delivery. Again, No_2 and O_2 in 80:20 mixture was used. Many of those receiving gas had a negligible amount, and would turn their faces away from the mask when they felt themselves becoming narcotized. In most cases, we have insisted on a partial or complete anesthesia. The amount of gas used in the 585 cases was 10 size E tanks. This does not include the anesthesia given in the sections, nor in the 13 cases where complete anesthesia was used.

The episiotomies done in the primiparas reached a much higher percentage than in the multiparas.

TABLE XV
Episiotomies and Lacerations in 198 Primiparas

	Number	Per cent
Episiotomies	177	89.38
No episiotomies	13	6.56
One per cent lacerations	6	3.03
Two per cent lacerations	2	1.01

One of the most satisfying results in this method is the morbidity, or lack of morbidity, in the mother as well as in the baby.

TABLE XVI

Morbidity:
All patients home within 7 days.
Hemorrhage:
2 patients required packing.
1 patient had fibroid (hysterectomy)
1 patient had dilatation and curettage six weeks later.
Transfusions:
Given in four cases.
Two cases of bladder infection.

There were no maternal deaths, although this is not significant in this small series. All mothers left the hospital in seven days or less. Two had a uterine inertia following delivery, for no apparent reason. A uterine pack was inserted for a few hours in each patient and neither required a transfusion.

One patient had a submucosa fibroid and continued to have excessive bleeding which was not controlled by a dilatation and curettage performed three weeks after delivery. The laboratory report showed a submucosa fibroid and a hysterectomy was done subsequently.

Four patients were given transfusions. These included the two placenta previas and abruptio placenta, and one patient who bled excessively following a spontaneous delivery. There were two cases in which bladder infection occurred after returning home. There were no cases where a pelvic infection was demonstrated.

There were no intrapartal deaths. In the three stillbirths listed in Table XVII the fetus was dead prior to hospital entrance.

TABLE XVII
Stillbirths and Neonatal Deaths

Stillbirths	3	4 Congenital heart
Neonatal deaths	7	3 Erythroblastotic

The neonatal deaths also cannot be attributed to any method. Autopsies, fortunately, were performed on all cases, so the diagnoses are correct. As far as we know, none of our babies have died since leaving the hospital, and we have a fairly good check because Dr. Flannery does the pediatric care.

The large number of repeat section has made the percentage a great deal higher than it otherwise would be. However, it is still a very low percentage. We do not try to deliver a patient from below who has had a previous section, no matter what may have been the reason for the original section.

TABLE XVIII
Sections Explained

Multiparas:		
Repeats	12	
Placenta previa	2	
Placenta abruptio	1	
Total		15
Primiparas:		
Toxemia	1	
Arthritis	1	
Fetal tones	1	
Prolonged labor	1	
Pelvis small	1	
Total		5

The section done in the primipara in whom the fetal heart tones had become irregular and weak might possibly have not been needed. However, in this case, the couple had been married several years, and the mother had had two spontaneous abortions. At the time of the section, she had been in labor about 14 hours and was dilated only 4 centimeters. All the babies from the sections are alive and well at the present.

CONCLUSIONS

1. We feel that had it not been for their untiring efforts and enthusiastic work of our two registered nurses, our work would not have been successful. The nurses who make a method such as this go over must be pleasant, dignified, and understanding.

2. The total number of hours in labor is greatly reduced. This may encourage those who think the method is time consuming. It does take a great deal of time for the organization at the beginning, but once the program is underway many less hours are spent in the hospital.

3. Morbidity is greatly lessened in mothers and babies. Mothers seem to feel better during pregnancy, and especially following delivery. They are happy and only one in this series has required psychotherapy following delivery. The psychiatrist felt that the method did not cause her trouble.

Most of the babies began to cry immediately following delivery, and they rarely show anoxia or atelectasis. None of the babies actually required resuscitation, although a few were put in the air lock for removal of excessive mucus.

4. Deliveries are less complicated, which adds to the safety of the mother and baby. The safety factor is one of the outstanding points to be considered in any method used.

5. Average loss of blood is much less, although uterine inertia may still occur as it did in two of these cases. Most obstetricians will agree that deep anesthesia causes more bleeding. Of these patients, 98 per cent have normal hemoglobin figures when returning for their six weeks' checkups.

6. No real attempt was made to evaluate amount of pain or discomfort that the patients had. However, it is safe to say they must have had very little in the majority of cases as evidenced by their enthusiasm in recommending the method to other expectant mothers whom we are now attending.

7. Support during labor by properly trained nurses makes the program more successful. We feel that a trained person should give support from the time active labor begins until the baby is delivered. We have tried never to leave these patients alone. One of our nurses is with the patients from the time they begin active labor. We feel also that it is beneficial for the obstetrician to put in an appearance early in the patient's labor, and to be present especially during the transitional stage. We never leave the hospital when a multipara is in active labor.

8. We believe that probably the few people who are criticizing the method have not given it a fair trial, or may doubt that a patient can accomplish, with proper preliminary training, what a physician has been trained for years to do with all sorts of specialized drugs and instruments.

If these few critics would take the time to train a few patients rather than to quibble over the term "natural childbirth," and whether a patient is "hypnotized" or "relaxed",[4] I believe they would find their time well spent and would enjoy the results.

(Continued on page 310)

Suprapubic Vesicourethral Suspension for Stress Incontinence*

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STANDARD TECHNIQUES for the correction of stress incontinence of the female are successful in all but from 10 to 25 per cent of the patients. Because this small segment remained with their complaint, Marshall, Marchetti, and Krantz[1] in 1949 studied the cause of stress incontinence and presented an approach which was appealing because it apparently restored normal anatomy and corrected incontinence. The suprapubic vesicourethral suspension as described by Marshall and his coworkers has been accomplished on 27 patients, seven of whom have undergone surgery in the past three months. The remaining 20 have been followed for more than three months, and their case histories and follow-up examinations constitute the basis for this presentation.

MATERIAL

The 20 private patients comprising the original group all had stress incontinence as one of the major symptoms. In addition to routine complete preoperative workup, patients were subjected to the following simple test. With the bladder palpably filled with urine or saline, she was asked to cough. If stress incontinence was demonstrable, which it necessarily had to be in this group, the two examining fingers were placed in the anterior fornix and the vault was elevated toward the umbilicus. If then on coughing or more severe stress, no incontinence was demonstrable, the patient was advised of the nature of the procedure, what had been accomplished for other patients, and the advantages of this approach. If there was no anatomic lesion of sufficient size to account for incontinence, patients were given no assurance that the procedure would give a good result, but were told there was no reason to believe the result would be poorer than with any other technique. With the exception of case 5, no patient could interrupt the flow of urine voluntarily.

Of the 20 patients whose histories are presented, eight had previous vaginal repairs for the relief of stress incontinence, four of which were done by the authors.

Twelve of the 20 patients had other symptoms or findings which made it advisable to do other major or minor pelvic surgery. In fact, it was often because abdominal procedures were required that the vesicourethral suspension was used to correct the incontinence.

OPERATIVE TECHNIQUE

The technique in principle is identical to the vesicourethral suspension as described by Marchetti and Krantz.[1] With experience, minor changes have evolved which appear to simplify the technique. A Foley catheter is inserted into the bladder and the 5 cc. bag filled with air. Thirty cubic centimeters of 0.5 per cent methylene blue is injected through the catheter. The patient is prepared and draped in the so-called "Iowa position," the mild Trendelenburg position with the legs suspended in low stirrups. After the anterior rectus and pyramidalis muscles have been separated from the midline through a Pfannenstiel incision, the bladder base and urethra to the meatus are easily displaced by simply sliding the hand down the posterior surface of the symphysis pubis. Usually no resist-

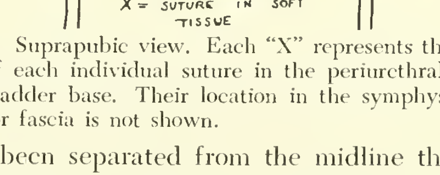

Fig. 1. Suprapubic view. Each "X" represents the location of each individual suture in the periurethral tissue and bladder base. Their location in the symphysis and anterior fascia is not shown.

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ance is encountered unless some dense deforming adhesion has formed from previous surgery.

The left hand of the operator is then slid under the drape into the vagina with a finger on each side of the catheterized urethra. The urethra and bladder base are then easily palpable between the abdominal and vaginal fingers and constricting or deforming adhesions are easily separated. Using No. 1 chronic catgut throughout, a suture is placed one centimeter from the urethral meatus just lateral to the urethra and as deep to the vaginal mucosa as possible without penetrating it.

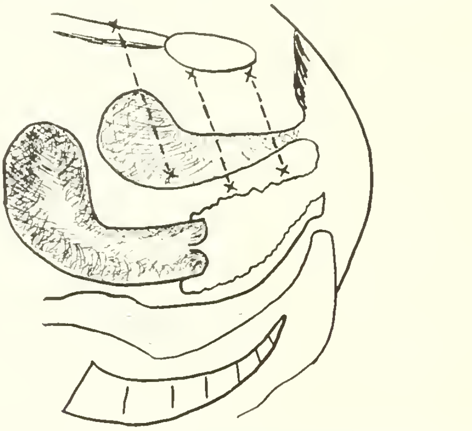

Fig. 2. Sagittal view showing the location of the sutures on the patient's right side in relation to the urethra, bladder, symphysis, and anterior fascia. The dotted lines represent the placed but as yet untied sutures. Note the uncorrected position of the bladder and urethra as seen in many patients.

The same procedure is carried out on the other side. Sutures are tagged without tying. The same procedure is carried out 2 cm. from the meatus. Then, just above the urethrovesical junction as determined by the inflated Foley bag three sutures 3 cm. apart are placed transversely in the bladder base. The field is carefully examined for telltale bluish black dye spots. If present, the suture is simply removed and placed more laterally. We have found this penetration of the bladder has done no harm if recognized. The vaginal hand is then removed, gown and gloves are changed, skin towels are placed on the abdomen. This step removes the necessity of an assistant's hand in the vagina and considerably enhances the ease with which the sutures can be properly placed.

Using a sturdy round needle, the inferior urethral sutures are now carried through the lower posterior symphyseal periosteum. The second sutures are placed in the superior posterior symphyseal periosteum. The bladder base sutures are placed through the anterior rectus fascia, the lateral sutures lateral to the pyramidal insertion and the central one between them. Beginning with the inferior level, sutures are now tied. A drain is inserted in the nearly obliterated space of Retzius and the incision is closed. For the past two years we have not used abdominal dressings, so in this procedure an abdominal pad is placed over the drain and held in place by the T-binder.

When this procedure is done in conjunction with others, it is performed last. The catheter is removed in thirty-six and the drain in seventy-two hours. The patient is ambulatory on the first postoperative day. If the course has been uneventful, she is discharged on the sixth or seventh day.

RESULTS

Thus far results have been excellent. To date, only one of the 25 patients operated upon has not been completely relieved of stress incontinence (case 5). It is obvious that the incontinence in this patient was of neurogenic origin and no benefit should have been expected, and therefore the procedure should not have been attempted. Of the 20 reportable patients, results thus are 95 per cent excellent, 5 per cent none. However, having no interest other than giving the procedure a thorough trial, we have employed it in other problem patients with no right to expect the good results that have been obtained. Case 10 is an example. Another example from the last group of seven patients operated upon recently warrants mention even though it is too soon to give a final report. The patient had two previous colpoperineoplasties, the latter employing the "Kelly stitch" in addition. The incontinence not only persisted but the patient also developed recurrent episodes of posterior urethritis and cystitis with persistent residual urine. The urethra was scarred into a rigid S-shaped tube that bled freely when frequent urethral dilatations were resorted to. The patient was in pain most of the time with what seemed an insoluble problem. Without promise of benefit, urethra and bladder base were dissected free from the surrounding scar tissue. Dye was encountered seven times during the procedure. A suprapubic vesicourethral suspension was done. The catheter was removed in sixty hours, and from that day until the present, which has been ten weeks now, the patient has not experienced dysuria, nocturia, or stress incontinence. At the time of her six weeks examination she stated, "Six years of misery, six weeks of heaven. I now actually enjoy urinating."

The ages of these patients varied between 33 and 68 years with an average age of 48. They had delivered from none to 11 children with an average of 3.5. Average operating time when the suspension alone was done was 50 minutes. In the last six patients it has been 41 minutes. Fifteen of the first 20 patients had drain. Now most patients are drained unless there has been no oozing at the time of surgery. The first patient operated upon was not drained and developed a hematoma which required drainage. The second patient developed a wound infection. She had a drain but also had a dressing. The fifth patient had a wound infection but was not drained. All these cleared up without event and did not prolong recovery, but they did teach us the necessity for drainage, the futility of attempting to stop oozing which usually would result in more oozing, and the advisability of keeping wounds undressed. The first seven procedures were accomplished with the help of an assistant's hand in the vagina. Also four of the first five procedures were done through a midline incision, whereas since that time it has been used only once.

In the last 22 procedures, there has been no patient who has had a morbid course (100.4° on two successive days) and there have been no other complications.

The repeated follow-up visits have shown that this procedure apparently completely eliminates large cystoceles and urethroceles.

It is hard to describe the excellent anatomical results other than to say that the anterior wall of the vagina closely resembles that seen in a young girl. No other technique in our hands has produced anatomic results superior in any patient to the results obtained by this procedure in every patient. But because of the relatively short period of follow-up, the permanence of this result has not as yet been established.

CASE REPORTS

Explanation of Symbols. Stress incontinence (SI) is 1+ if present on cough or sneeze only, 2+ if present on laughing or lifting, 3+ if present on light lifting or jiggling, 4+ if flooding on mild activity such as arising. MMK = Marshall, Marchetti, Krantz procedure. OT = operating time. Pf = Pfannenstiel. SP = midline suprapubic. FU = follow-up.

Case 1. No. 79641, age 42, para 7-1-1. SI 4+ 1 year. Sense of prolapse. Large cystocele. MMK done on 16th day postoperative of choledocholithotomy. OT 40 minutes. No drain. SP. PO hematoma. Discharge 6 days. Nine months FU – excellent anatomical and functional result.

Case 2. No. 129934, age 68, para 5-0-5. SI 4+. Five months previously by us had vaginal hysterectomy, Kelly stitch, and colpoperineoplasty with no relief. Recurrent cystocele. MMK procedure June 15, 1950. OT 45 minutes. No drain. Pf. Mild wound infection. One and one-half year FU—excellent anatomical and functional result.

Case 3. No. 133689, age 58, para 6-0-6. Bearing down sensation, SI 2+. Large cystocele and large bilateral asymptomatic cystadenomata. July 28, 1950, panhysterosalpingeoophorectomy and MMK. OT 110 minutes. SP. Drained. Smooth 9 days. Fourteen months FU – excellent anatomic and functional result.

Case 4. No. 26306, age 48, para 5-0-2. Bearing down pelvic pain. SI 1+. Large urethrocystocele and 15 cm. myoma. August 8, 1950 had panhysterosalpingo-oophorectomy and MMK. OT 90 minutes. SP drained. Smooth 8 days. Nine months FU—excellent anatomical and functional result.

Case 5. No. 94229, age 66, para 0-0-0. SI 4+, 25 years. Mild anemia under liver therapy by local physician, probably pernicious anemia but not able to prove because has had no remission in recent years. Suspected of neurogenic incontinence. Had repair and suspension 1932, no lesion and no relief. No demonstrable lesion on examination. August 19, 1950, MMK, 80 minutes. SP drained. Postoperative wound infection. Discharge in 10 days. At 6 weeks and 6 months no lesion but still had 3+ SI. Not seen since.

Case 6. No. 98364, age 50, para 11-0-10. SI 3+ since colpoperineoplasty in 1947, repeated with vaginal hysterectomy, 1949, with no relief of incontinence done by us. Diabetes, arteriosclerosis, moderate cystocele and enterocele. October 12, 1950, MMK and abdominal enterocele repair. OT 65 minutes. Pf drained. Smooth 10 day course. One year FU—excellent anatomic and functional result.

Case 7. No. 134162, age 33, para 2-0-2. Dyspareunia, severe premenstrual pain, 2+ SI. Large cystocele, extensive, diffuse pelvic endometriosis. January 18, 1951, panhysterosalpingo-oophorectomy and MMK. OT 110 minutes. Pf not drained. Smooth, 8 days discharge. Ten months FU—excellent anatomical and functional result.

Case 8. No. 132903, age 45, para 3-0-3. Menorrhagia, SI 2+. Large cystocele, submucous myomata at dilatation and curettage. February 16, 1951 had panhysterosalpingo-oophorectomy and MMK. OT 95 minutes. SP no drainage. Six months FU—excellent anatomical and functional result.

Case 9. No. 61670, age 41, para 2-0-1. SI 2+, progressive severe dysmenorrhea and dyspareunia. Appendectomy in 1948. Severe pelvic endometriosis, poor anterior support. March 22, 1951, a subtotal hysterectomy and bilateral SO with a MMK was accomplished with considerable difficulty because of gut perforation in the endometriosis around the cervix. It was decided not to remove the cervix because of this perforation. Patient had a smooth course but was kept 11 days because of perforation. Six months postoperative check showed excellent anatomic and functional result with no bowel symptoms.

Case 10. No. 72719, age 43, para 3-1-3. SI 2+. 1947, colpoperineoplasty; 1949, same plus Kelly stitch with vaginal hysterectomy. SI persisted. No demonstrable lesion but elevation of vault relieved incontinence. May 1, 1951, negative abdominal exploratory and MMK. OT 40 minutes. SP no drain. Smooth 6 day course. Excellent functional result at 4 months.

Case 11. No. 87030, age 50, para 1-1-1. SI 3+, backache, dysparennia, dysmenorrhea. Colpoperineoplasty and dilatation and curettage elsewhere in 1946 for SI and bleeding. No relief of SI. Good support on examination but elevation relieved SI. Severe endometriosis, myomata. May 21, 1951, panhysterosalpingo-oophorectomy and MMK. OT 70 minutes. SP drained. Smooth 7 day course. Excellent functional result at 4 months.

Case 12. No. 116430, age 41, para 1-1-1. SI 3+ 12 years. Perineal exercise helped for 6 months but after this time could no longer control urine. Moderate cystocele, rectocele, and enterocele. June 15, 1951, had postcolporrhaphy and MMK with repair of enterocele. OT 55 minutes. Pf drained. Five months later has excellent functional and anatomic result.

Case 13. No. 68795, age 28, para 4-1-4. SI 3+ 2 years. At delivery had posterior perineorrhaphy because planned MMK and tubal at 6 weeks. Returned with infarcted 11 cm. right ovarian pseudomucinous cystadenoma 4 weeks PP at which time had right oophorectomy, appendectomy, Pomeroy sterilization and MMK on July 5, 1951. OT 55 minutes. Pf no drain. Smooth 7 day course. At 3 months outlet tight with excellent anatomic and functional result.

Case 14. No. 56038, age 43, para 2-0-2. SI 3+ 2 years. Examination revealed small cystocele with good result from test, lacerated cervix and endocervical polypi. July 31, 1951, dilatation and curettage, biopsy and MMK. OT 60 minutes. Pf drained. Examination at 3 months showed excellent anatomic and functional result. "Why, I can even sneeze."

Case 15. No. 123481, age 59, para 5-0-4. SI 3+. In 1943, had suspension and colpoperineoplasty elsewhere with no relief of SI. Small cystocele present, with relief by test. August 8, 1951, had pelvic inspection and MMK. OT 60 minutes. Pf 60 minutes. Smooth 6 day course. Excellent functional and anatomic result at 3 months.

Case 16. No. 14145, age 59, para 6-0-4. A "flooder". SI 4+. Had panhysterosalpingo-oophorectomy in 1944. Small cystocele but vault elevation relieved SI. August 8, 1951, had MMK. OT 35 minutes. Pf drained. Smooth 7 day course. At 3 months excellent functional and anatomic result.

Case 17. No. 145482, age 49, para 2-0-2. SI 3+, bearing-down pain in pelvis. Presumably had subcostal hysterectomy elsewhere 1944. Nodular enlarged pelvic mass and minimal cystocele found. Relief of SI by test. Re-entered old SP midline scar, panhysterectomy of myomatous uterus, MMK, OT 95 minutes, September 2, 1951. Drained. Smooth 6 day course. Three months FU complicated only by one episode of acute cystitis. Excellent control of urine.

Case 18. No. 18209, age 54, para 3-0-3. SI 3+ 4 years. Tried perineal exercises eight months in 1951, but relief minimal and lasted only three months. Only minimal cystocele present, but test positive. September 27, 1951, PF, MMK, drained. OT 35 minutes. Smooth 5 day course. Three months FU with excellent control of urine.

Case 19. No. 131558, age 33, para 2-0-2. SI 2+, RIQ pain and tenderness. Minimal cystocele, right adnexal 8 cm. cystic mass. Test relieved SI. October 2, 1951, Pf incision, appendectomy, freeing up old inflammatory cyst, tested tubal patency, MMK, OT 60 minutes, drained. Smooth 7 day course. Follow-up shows excellent control.

Case 20. No. 56434, age 40, para 2-2-2. SI 3+. Modern cystocele, 2° descenius uteri, but good posterior support. Test gave relief. Because of friend's success, patient requested MMK. Pf MMK, suspension of uterus, OT 90 minutes, drained. Smooth 6 day course. Excellent control 11 weeks postoperative.

DISCUSSION

The Marshall-Marchetti-Krantz procedure certainly justifies further trial. It is our opinion that when properly and carefully done with stress incontinence as the indication and with the simple test of supporting the filled bladder showing continence, it will occupy a valuable place in the armamentarium of the operating gynecologist. It is clinically impractical to apply cystometry and other special techniques to patients in private practice, even though the information gained therefrom is valuable. It was felt that if this vault suspension test, which is certainly simple and without expense, proved itself of value, then the operative procedure would be more appealing to the practicing gynecologist. Also, because our sole aim was to test the effectiveness of the procedure for the relief of stress incontinence regardless of its background, we felt that if the results were good, so was the procedure. However, if the results were not good, we would be in a position where we would have to determine whether the test or the procedure required further investigation to determine the reason for failure. Since, up to the present time, test and procedural appear to meet that aim, excluding possibly neurogenic lesions causing incontinence, we accept the explanation of Marchetti[2] and Muellner[3] as to the cause of stress incontinence.

The operative procedure is one then of simply freeing the bladder base and urethra from any rigid structures and removing constricting and contorting adhesions, and supporting these structures as close to and as high on the anterior abdominal wall as is practical. Because we are uncertain as to the effect and necessity of supporting the dome of the bladder trigone area, these areas are not disturbed or supported. The disappearance of cystocele is unexplained in view of this.

The acceptance of a new operative technique and principle demands a fairly prolonged trial by many. At this time we can do little else than to encourage others to try it also. Our only complications occurred in our first five attempts, but the results appear to be of such a nature we find ourselves doing the procedure with increasing frequency, comprising one-tenth of all bladder repairs thus far in 1951.

It might appear as if our enthusiasm for this

(Continued on page 314)

Surgical Treatment of Recurrent Carcinoma of the Cervix*

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The primary treatment of choice for carcinoma of the cervix is x-ray and radium. Our report published in 1950[1] of 983 patients with cervical carcinoma revealed an absolute five year survival of 30.4 per cent. Between 1937 and 1942 there were 337 cases treated with an absolute five year survival of 39.4 per cent. During this same period there were 183 patients treated exclusively at the University Hospitals by x-ray and radium with a five year survival rate of 51.9 per cent. This improvement in results has been obtained by individualization of therapy, liberal use of blood transfusions, improved management of nutrition and fluid balance, and more specific remedies to combat infection. Close cooperation between the Department of Radiology and the Department of Obstetrics and Gynecology has also been of great importance.

However, not all patients respond satisfactorily to irradiation, and some come back months or years later with findings and symptoms suggestive of recurrence. The difficult problem of diagnosis and treatment is then encountered.

First, what indicates the presence of recurrence? Some patients complain of vaginal bleeding and pain, others may mention the presence of a mass, and others have bowel and bladder difficulties, often due to recto-vaginal or vesicovaginal fistulas. Some are free of symptoms, but recurrence is found at the time of a routine post-treatment check. The problem is further complicated due to the fact that in certain patients the pain, and even bleeding and evidence of marked pelvic fixation, may be produced by the fibrosis resulting from irradiation therapy.

A second consideration is establishing the presence of recurrence. If the symptoms or findings are suggestive, a biopsy is obtained from the cervix or vaginal apex. Often there is a crater, in which case the tissue must be taken from the crater edge. In two-thirds of the cases, there was visual evidence of neoplastic tissue with a small crater. In many instances, the punch biopsy is inadequate and the patient must be hospitalized so that a larger wedge of tissue can be obtained and the cervical canal can be curetted. Usually the histologic interpretation is not difficult. However, there are times when the pathologist observes small nests of malignant-appearing cells, and it is difficult to determine if this represents viable neoplastic tissue. Several years ago it was hoped that the vaginal smears would be of material benefit in determining those patients who were not responding satisfactorily to irradiation and also those patients who had recurrence that was not yet evident. The study of a large number of such patients with suspicious or even positive smears indicates that this method is of little value.

The mortality and morbidity with all types of therapy are so high in patients with recurrence that one must be reasonably certain of the diagnosis before instituting treatment. In certain instances, biopsy has not established the diagnosis. Cystoscopic and proctoscopic examinations have been of very limited value as diagnostic aids. Abdominal exploration has been carried out in selected patients in the hope of establishing the diagnosis and determining operability. It has been surprising to find that exploration is of little value in diagnosing recurrence. The patient may appear to have a most extensive vaginal lesion, however, when the abdomen is opened, there is often no evidence of carcinoma. Enlarged regional lymph nodes may not show evidence of carcinoma on frozen section. In the earlier part of this study, four patients were surgically treated for recurrence without histologic proof prior to surgery, and carcinoma was not found in the surgical specimens. Three were treated by the Wertheim hysterectomy and one by viscerectomy. There was one death in this group. Since that time, no patient has been subjected to any form of curative surgical therapy without histologic proof of recurrence.

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Since 1946, 32 patients with recurrent cervical malignancy have been treated by surgical means.* These patients were all referred to the Department of Radiology, and further irradiation was not advised since it was felt that the previous therapy had been carried to the point of tissue tolerance. Many of these patients had received their primary therapy elsewhere. This group does not represent all the patients with recurrence. There was a considerable number who were given further x-ray or radium. Others were deemed hopeless and were sent home on symptomatic therapy. There was a smaller group in which operation was advised but was refused because of the risk and apparent inconvenience of a wet colostomy. It should be emphasized that this is not a report dealing with the merits of surgery as a primary treatment, but only with its use in recurrent cervical malignancy.

These recurrences were noted during the first year in 60 per cent of the cases. There were three patients, however, where the carcinoma was found 12, 16, and 17 years after treatment. The question whether this was residual or a new neoplasm appearing in radiated tissue is pertinent. In two of the three cases, it would seem that the lesion represented a new neoplasm. The first patient was treated originally for cervical cancer and developed an epidermoid carcinoma in the vagina, just lateral to the apex, 12 years after treatment. The second patient was first treated for a malignant epidermoid cervical lesion. The new carcinoma which occurred 16 years later was a mature adenocarcinoma of the cervix and uterus. A third patient with a mature epidermoid lesion, was found 17 years later to have both epidermoid and adenocarcinoma.

The preoperative preparation of these patients must be thorough and complete. Blood urea-nitrogen and creatinine determinations are made. Cystoscopic examination and intravenous pyelograms are obtained. Often a barium enema is done, and all patients have a proctoscopic examination. Complete blood studies, including plasma proteins, hematocrit, and blood volume determination, are required. Films of the chest and bony pelvis are studied for metastasis. Blood transfusions are given preoperatively when needed. The bowel is prepared by sulfasuxidine and streptomycin, with enemas, and a liquid diet.

Of these 32 patients treated surgically, eight were explored and found to have inoperable cancers. This was usually because of aortic lymph node involvement or extensive pelvic fixation. One patient is still living. This woman did not have carcinoma, though abdominal carcinomatosis was simulated by the presence of numerous nodules of encysted vaseline. Vaseline had been placed in the abdomen at an earlier operation to prevent adhesions. This patient also had large vesico-vaginal and recto-vaginal fistulas resulting from irradiation.

Nine patients were treated by the Wertheim hysterectomy. These patients did not have extensive spread. The uterus and cervix were fairly movable and the recurrence seemed of a local nature. It is interesting to note that 44 per cent of this group had a very early lesion that had been treated with transvaginal irradiation. As previously mentioned, in three of these cases, carcinoma was not found on the removed specimen; in two, the biopsy was reported as containing highly suspicious cells; the third was operated on because of what was thought to be palpable evidence of spread. Despite the radiation fibrosis, this operation was not extremely difficult. There were no operative deaths nor bladder or ureteral damage in this group. Three of the six patients had lymph node involvement. Three of the patients with proven carcinoma, or 50 per cent, are living and well 5, 3, and 2 years respectively. Three died with massive recurrence 12, 15, and 17 months after surgery.

There were 15 patients who were subjected to the more radical pelvic viscerectomy. The youngest was 23 and the oldest 65; however, most were fairly young. Many had been treated elsewhere and were referred to the University Hospitals. Three had been treated previously by some form of hysterectomy. The type and time of recurrence was the same as in the other groups. The type of spread was extensive and, in each instance, no other method of therapy was available. These patients were all in reasonably good physical condition and none had any demonstrable evidence of spread beyond the confines of the pelvis. Carcinoma was found in bowel, bladder wall, lymph nodes and cervix in most instances. In one instance carcinoma was not found and the patient died one year after the operation.

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*Many of these cases are being included in a report of results of the operation of total pelvic viscerectomy for extensive pelvic cancers in both males and females by E. S. Brintnall, M.D.

Complete pelvic viscerectomy is a severe operative procedure and at present is carried out chiefly in the larger teaching centers where adequate personnel and facilities are available. The expense of hospitalization to the private patient undergoing pelvic viscerectomy is almost prohibitive. The average patient in this series received 12 transfusions and was in the hospital 54 days. The convalescence is prolonged and often special nursing care is required.

The total viscerectomy, as now carried out, consists of an abdomino-perineal resection of bladder, uterus, tubes, ovaries, cervix, vagina, fascia propia, regional lymph nodes, anus and rectum, and part of the sigmoid colon. Four earlier cases were of the supralevator types. Eleven were one stage abdomino-perineal procedures. Recently two teams have been employed, one performing the abdominal portion, the other the perineal dissection. In 2 instances, the bowel was saved, 13 had a terminal sigmoid colostomy. Usually the right ureter was anastomosed to the cecum and the left ureter to the sigmoid colon. A simple non-tunneled, end-to-side uretero-intestinal anastomosis was utilized. In most instances, the pelvic peritoneum was widely sacrificed so that pelvic reperitonealization was not possible and is probably unnecessary. The operation ordinarily lasts from two to three hours and large amounts of blood are required. Intra-arterial transfusion probably should be employed as a routine technic in operations of this type. Early in the operation, the hypogastric arteries are ligated to minimize blood loss, and the hypogastric veins are ligated, both to lessen venous bleeding, and to reduce the incidence of postoperative pulmonary embolism.

As one would expect, the operative mortality is high. There were 6 patients who died within the first month, a 40 per cent mortality. Three died of pulmonary embolism on the third and fourth days; one died of shock on the operating table; and 2 died of urinary tract infections with uremia on the twentieth and thirtieth days. Another 40 per cent were dead within a year, most dying within three to four months. The late causes of death were recurrence, renal failure, infection, and intestinal obstruction. There were 20 per cent, or 3 patients, that are living and well 2, 2½, and 3 years after surgery. One must remember that this entire group represented patients doomed to death from malignancy, so this salvage is significant; many of the others who died within a year were made more comfortable by the operation.

We have attempted radical surgery on certain other types of recurrent pelvic malignancy with rather poor results. Two patients with endometrial carcinoma were explored and declared inoperable; two ovarian carcinomas with recurrence were treated, one by a Wertheim and the other by viscerectomy; both died one year later. One recurrent carcinoma of the vagina was treated by viscerectomy; the patient died 10 months later.

SUMMARY

A group of 32 patients with recurrent cervical malignancies have been treated by surgical means.

(1) Eight were felt to be inoperable.

(2) Nine were treated by Wertheim hysterectomy. However, three were shown not to have residual carcinoma; excluding these three or fifty per cent of the patients have survived over two years.

(3) Fifteen were treated by radical viscerectomy; three or twenty per cent are living and well more than two years after the procedure.

(4) We feel justified in continuing this type of treatment on selected patients with proved recurrence as the salvage to date for the entire group has been 18.7 per cent.

The authors wish to acknowledge the contributions to this study which was made by Dr. Willis Brown who was concerned with the initiation of the principle of pelvic viscerectomy for recurrent cancer of the cervix.

REFERENCE

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"If pathology were perfect, nomenclature would be a science as exact as mathematics; but while room for doubt remains in that, as it always must, to some extent, variability and uncertainty will remain among the names used to stand for diseases. Hence, we must not now, or ever, accept any system of names as perfect, final and no further to be modified. When we do so we will pass from intelligence to empiricism. The system of names must not hamper opinion, only hold it in restraint against fanciful freaks in the production of varieties of terms."

Editorial. *Northwestern Medical & Surgical Journal* (The Journal-Lancet) 3:140-143, 1872.

Obturator Internus Spasm as a Cause of Pelvic and Sciatic Distress*

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Observations relating to causes of low back and sciatic pains are many. There is no field of practice that does not have to contend with this complaint. The orthopedists have it from the standpoint of skeletal defects and in recent years the orthopedist and the neurosurgeons have both been operating on herniated disks to free impinged nerve fibers as a cure for back and sciatic pain. The proctologist feels that many of these aches are caused by inflammatory or other lesions of his restricted field of operations. The urologist thinks in terms of the prostate and the kidneys as the cause. The gynecologist has probably more remedial procedures, though be it some are to be condemned, than have any of the specialists. We can all recall belts, corsets, suspension operations, hysterectomies and perineorrhaphies, all done in attempt to relieve back ache.

The present observations came as a result of the persistence of a train of symptoms in a patient, age 30, who first reported on August 1, 1949, complaining of a pain and feeling of fullness in her rectum, and some pain down the back of her left thigh. I will not discuss the complete examination of this patient, but rather the findings that are pertinent to our subject. Perineum and anus were normal on inspection except for a slight laxity of the perineum. She had no fissures and no hemorrhoids. Uterus was anterior, freely movable and not tender. Both adnexae were somewhat tender. Coccyx was not tender. Cervix was clean. On rectal examination there seemed to be an area of tenderness to the lateral and slightly anterior wall of the rectum. In the course of the examination and general manipulation her pain disappeared. She again reported in November of 1949. Again examination was negative, pain was not related to menstruation and she was advised to take some hot douches and hot sitz baths.

She seemed to be free until August of 1950 when she again complained of this feeling of fullness and pain around her rectum. She said she was not constipated. The examination again was negative until I inadvertently, during her pelvic examination, turned to answer a question by my nurse, and the patient writhed with pain. In checking the cause of this pain, it was discovered that my examining fingers had exerted a moderate pressure anterior and to the left, well up behind the pubic bone. This pain could be reproduced by digital pressure. Exploration of the pelvis again revealed pain on pressure over the obturator internus muscle. The origin of the levator ani, where it reflects away from the obturator fascia, could be palpated. Above this was a point which caused her pain. Again there was no tenderness over the sacrum or the coccyx or over the origin of the piriformis muscle. Her pain subsided somewhat on general massage, and she was advised to take hot sitz baths and douches; but this time she did not seem to obtain the relief that she had on the previous occasions. In October of 1950 she was started on a course of Teca treatments, given by our physiotherapist, which stimulate the muscles with the faradic and galvanic current. This seemed to give better results than anything tried previously. She has been symptom free for a year.

Anatomy books describe the obturator internus and gemelli muscles as follows: "*Obturator internus.*—The obturator internus arises from (1) the whole of the margin of the obturator foramen (except the obturator groove); (2) the inner surface of the obturator membrane; (3) the whole of the pelvic surface of the hip bone behind and above the obturator foramen; and (4) the obturator fascia which covers it. It is a fan shaped muscle whose fibers converge to pass through the lesser sciatic foramen (figure 1). Its tendon begins on the surface next to the bone as four or five separate slips; and as the muscle changes its direction at an acute angle by hooking round the margin of the lesser sciatic notch under the sacrotuberous ligament, those tendinous slips also converge to play over corresponding grooves in the cartilage-covered surface of the bone, facili-

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*Read at the four-state meeting of the Minnesota, Wisconsin, North Dakota and Iowa obstetrical societies in St. Paul, Minnesota, December 1, 1951.

†Leigh Clinic, Grand Forks, North Dakota.

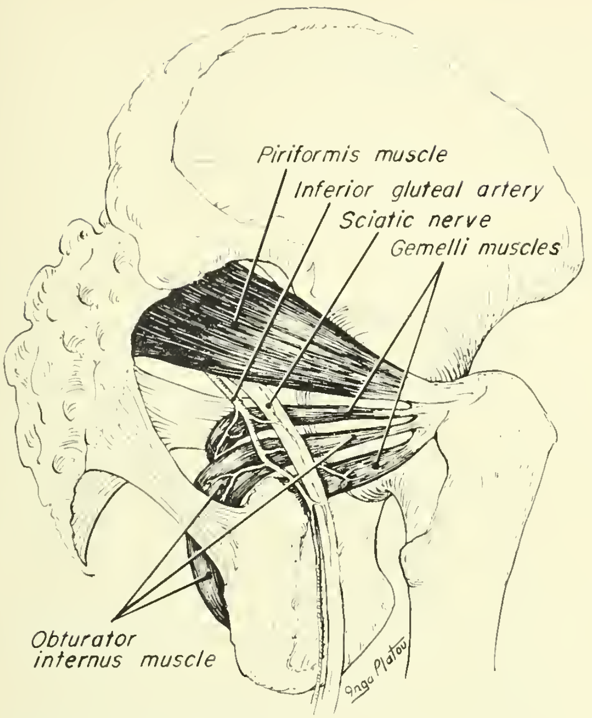

Fig. 1. Bulky, fan-shaped body of obturator internus filling lateral portion of pelvis.

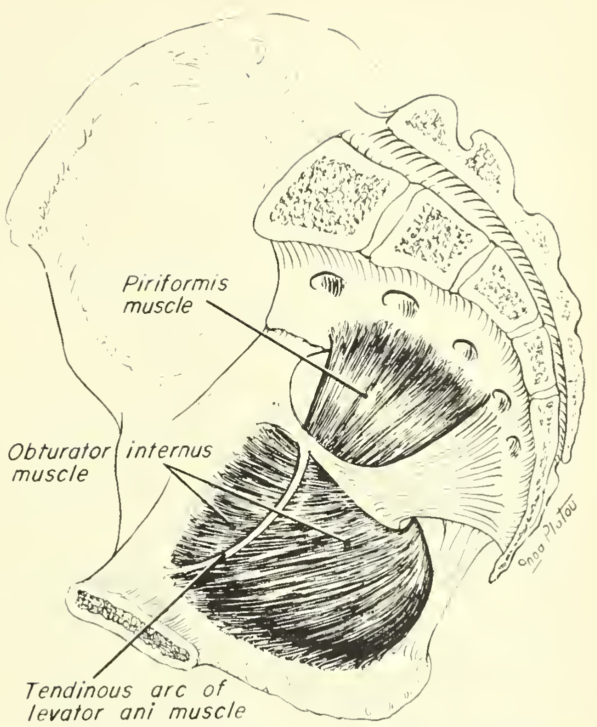
Piriformis muscle
Obturator internus muscle
Tendinous arc of levator ani muscle
Inga Platou

Fig. 2. Shows obturator internus and piriformis muscles and sciatic nerve with blood vessels emerging between obturator internus and piriformis tendons.

tating this movement. The tendon, after passing over the back of the hip joint, is inserted into the medial surface of the greater trochanter above the trochanteric fossa. The fleshy part of the muscle is covered with the obturator fascia, which gives origin to a great part of the levator ani; the part above the levator is related to the cavity of the pelvis and the part below to the ischio-rectal fossa. In the buttock the tendon is embraced by the gemelli muscles which meet deep to it as it emerges from the foramen and more or less conceal its superficial surface as it passes to its insertion. *Gemelli.* – The gemilli muscles form accessory portions of the obturator internus, providing it with an additional "twin" origin from the margins of the lesser sciatic notch. The superior gemellus arises from the gluteal surface of the ischial spine and the inferior gemellus from the upper part of the ischial tuberosity; each is inserted into the corresponding margin and the superficial surface of the obturator internus muscle."

The obturator internus and the gemelli muscles function as lateral rotators of the thigh along with the piriformus, obturator externus and quadratus femoris. When one examines and follows the course over the sciatic nerve, it will be found to leave the pelvis and enter the gluteal region through the greater sciatic foramen between the piriformus and the tendons of the gemelli and obturator internus (figure 2). If one remembers that there is a companion artery to the sciatic nerve which is a branch of the inferior gluteal nerve trunk, one can see that a spasm of either the piriformus muscle or the obturator internus and gemelli muscles would couse a moderate constriction on the sciatic nerve and blood vessels causing a sciatic ache from resulting impaired circulation.

When the obturator internus muscle is viewed from above it appears as a large strong muscle separated from the rectum by the pelvic floor; and when one remembers that the levator ani has its origin on the obturator internus fascia, it is very logical that a bulging or continued spasm of the bulky portion of the obturator internus would give a feeling of fullness in the rectum, especially if it was partially filled with fecal material. Following this observation I admit I may be becoming obturator internus spasm conscious but I have seen a total of seven cases in the past two years which fitted into the same general symptom complex as I have described. Two of these had their pain on the right, the others were on the left. On two the pain was accentuated by extending and rotating the thigh. In four of these cases no plausible cause could be found, either traumatic or irri-

(Continued on page 310)

Menstrual Variations Associated with Changes in Altitude*

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THE EFFECTS of change of altitude upon various phases of human and animal physiology have been reported by numerous workers. Responses of cardiovascular, respiratory and hematopoietic systems have especially been investigated, but there have been fewer reports regarding the reproductive system. The altitude studies of Monge[1] deal with acclimatization of the human race and also of newly-arrived individuals in the plateaus of the Andes, 10,000 to 16,000 feet above sea level. His reports regarding the reproductive system deal chiefly with impairment of human and animal fertility.

There are few reports of menstrual data following altitude change. In 1931 Boshouwers,[2] writing from Mexico City (7,200 feet), reported three young women with amenorrhea following altitude increase and change of mode of life. In each case the previously normal menstrual rhythm was replaced by amenorrhea of "several months" duration after the women came from Europe to Mexico City. None proved to be pregnant.

In 1938 Müller[3] reported the menstrual histories of 16 women who came from the lowlands (approximately 3,600 feet) to the Jungfraujoch in Switzerland (altitude 11,350 feet) to ski or work. There was great variability in the menstrual patterns after altitude increase. Seven had increased amount of flow and one had amenorrhea on two separate occasions. Three developed irregular periods while two became regular. One developed dysmenorrhea, one became free of it. Four women continued to have regular normal periods. He reported that it frequently happened that female employees at the Jungfraujoch had to give up their work because of severe menorrhagia.

Animal studies have in most instances indicated that altitude change of sufficient degree affects the reproductive system. Müller[3] observed 20 white rats for three periods of 28 days each, first at Bern (about 1,800 feet), then at Jungfraujoch (11,350 feet), then again at Bern. Their cycles were definitely shorter and more irregular at the higher altitude. Moore and Price[4] reported well-controlled observations for 60 to 90 days on 1,000 rats, mice, hamsters and guinea pigs at 600, 7500, 9600, and 14,260 feet. At none of these altitudes was any effect noted on development of sexual maturity or the function of reproduction. Shettles[5] kept male guinea pigs in pressure chambers simulating an altitude of 19,000 feet for 89 days. The mating response disappeared in the first week, and study of electric ejaculations showed reduced volume, decreased or absent spermatozoa, and reduced motility. The changes were reversible. Sundstroem and Michaels[6] kept rats continuously at simulated altitudes of 14,000 feet, and up to 29,000 feet, for three or four weeks or longer. Even at 14,000 feet there was interference with reproduction.

METHOD OF STUDY

The present paper concerns women university students who had recently come to Boulder, Colorado (altitude 5,350 feet) from a different altitude. It includes menstrual histories, routine and special clinical observations and records of treatment. The group consists primarily of women who sought medical advice because of menstrual difficulties after altitude change. At the time of entering college, each woman had had a history and physical examination including chest x-ray, hemoglobin test and urinalysis. As soon as the student reported a menstrual problem, her case was followed by use of a uniform study sheet. The menstrual history was taken by direct oral questions. It was found that the menstrual record made by the student at the time of the entrance physical examination was not completely reliable. Students were instructed to keep written records of subsequent menstrual periods and to report at specific intervals especially after any therapy. Cases with inadequate cooperation or follow-up were omitted from the report, as were those who proved to have pelvic abnormalities which could have caused the menstrual disturbances.

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*This study was carried out at the Student Health Service, University of Colorado, Boulder, Colorado.

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It is recognized that considerable variability is the rule in menstrual histories of normal women and in grouping the cases normal menstrual history was defined as follows:

1. Menarche between 11 and 16 years.[7]
2. Usual interval (from first day of one flow to first day of next flow) was defined as 25 to 35 days with variation in the individual case of four days in either direction. These limits are in accordance with the figures of Hamblen[7] and of Arey.[8]
3. Normal duration of flow was considered as 3 to 8 days with amount not exceeding 12 well-saturated pads per period.
4. In an effort to exclude irregular menses of normal adolescence, a minimum of three years was required from menarche to time this study was initiated.
5. Cases were not excluded because of dysmenorrhea.

Basal metabolic rates were determined using Jones standards.* The normal range was considered as +10 per cent to —10 per cent. Hemoglobin determinations were done by photo-electric colorimeter. Vaginal smears for estrogenic activity were done by the method of Papanicolaou and Shorr.[9] A single differential stain† was used. These preparations were usually made on the fourteenth day of the cycle and at times when the student reported with secondary amenorrhea.

Altitude values were taken from Gannett's Dictionary of Altitudes.[10] A difference in altitude of 2,000 feet or more is implied in any statement regarding altitude change. This was an arbitrary designation since no data are available as to what constitutes a significant amount of altitude change in considering menstruation.

DATA AND OBSERVATIONS

The menstrual histories of 64 women were recorded from a few months to three years. Their age range was from 16 to 27 years but most of them were from 17 to 20. All menstrual changes reported occurred promptly after altitude change and most of them were temporary. Most of the women had been at one altitude nearly all of their lives before coming to Boulder. In all instances they had been at one general range of altitude for at least one year before the change. Observations will be presented according to the following outline:

I. Previously normal menstrual history			50 cases
A. Altitude increase		48	
1. Secondary amenorrhea ..	28		9 cases are tabulated under two headings
2. Flow too frequent or heavy	15		
3. Increase in dysmenorrhea	5		
4. Decrease in dysmenorrhea	9		
The amount of altitude increase in 3 patients was 2,000 to 2,999 feet, in 5 patients was 3,000 to 3,999 feet, in 32 patients was 4,000 to 4,999 feet, and in 8 patients was 5,000 to 5,350 feet.			
B. Altitude decrease		2	
II. Previously abnormal menstrual history			14 cases
A. Altitude increase		12	
B. Altitude decrease		2	

1. *Secondary amenorrhea.*

Data are presented in tables I and II regarding 46 episodes of amenorrhea in 28 non-pregnant subjects. Some cases appear in both tables. Eleven women experienced amenorrhea on more than one occasion after altitude increase. Approximately half the patients with amenorrhea (15 of 28) and more than half the episodes of amenorrhea (30 of 46) were associated with a basal metabolic rate lower than —10 per cent. If —15 per cent is regarded as the lower limit of normal, there were 11 hypothyroid women who had 21 episodes of amenorrhea.

Fourteen cases were treated with Prostigmin.* The rationale behind this approach will be mentioned in the discussion. It will be seen that individuals with normal basal metabolic rates tended to flow after a Prostigmin series, whereas such a response usually did not occur in those with low rates. This last group included two episodes in women on thyroid dosage judged adequate by resultant elevation of basal metabolic rates. Average duration of amenorrhea in the Prostigmin-treated group was 56 days. Most of the cases required three injections, and the average time of response was on the third day of therapy.

Episodes of amenorrhea not treated with Prostigmin are reported in table II. It is not intended that groups in tables I and II be compared since they are dissimilar in duration of amenorrhea, in thyroid function and in other ways. In many cases the episodes of amenorrhea reported in table II had corrected themselves before the student reported the situation. The average duration of amenorrhea in this group was 100 days. In nine episodes we learned that the next flow came within a few hours after an altitude change.

2. *Flows too frequent or heavy.*

The 15 women in this group include: 4 cases

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Age (F)	Calories/hr/m^2
16–18	37.0
18–20	36.0
20–30	35.0
30–40	34.5

†This stain was obtained from Wyeth, Inc., Philadelphia, Pennsylvania.

*Prostigmin was supplied through the courtesy of Hoffman-La Roche, Inc., Nutley, New Jersey.

TABLE I

Response of Altitude(?) Amenorrhea to Prostigmin and Relation of Thyroid Status to Response
(14 Cases — 19 Episodes)

Basal Metab. Rate	Case No.	Age at Onset of Study	Thyroid Therapy at Time of Amenorrhea	No. Days of Amenorrhea Before Prostigmin	Daily Dose Prostigmin: Milligrams x Days	Response		Remarks
						Yes, on Stated Day (a)	No. Flow on Stated Day	
10% to −10%	1	18	—	43	0.5 x 2	2		
	2	18	—	35 (b)	0.5 x 3	5		
	3	18	— — —	43 60 62	0.5 x 1 0.5 x 3 0.5 x 3	1 4 6		October 1947 October 1948 October 1949
	4	20	—	(50 (56	0.5 x 3 1.0 x 3		—(c) 15	Same period of amenorrhea 1948
	5	21	—	52	0.5 x 1	1		
	6	24	—	60	0.5 x 3	5		
Below −10%	7	20	Inad. Inad.	40 33 (b)	0.5 x 3 0.5 x 3	3	 11	Consecutive periods
	8	17	0	78	0.5 x 2	2		October 1947
	9	18	Inad. Adeq. Inad.	59 (99 (104 23 (b)	0.5 x 3 0.5 x 3 1.0 x 3 0.5 x 3		7 —(c) —(c) 15	Same period of amenorrhea
	10	18	0	79	0.5 x 3		—(c)	1949
	11	18	0	(65 (86	0.5 x 3 1.0 x 3		—(c) 15	Same period of amenorrhea
	12	18	Adeq.	91 (d)	0.5 x 3		? (30+)	
Unknown	13	18	—	34 (b)	0.5 x 3	3		
	14	25	—	59	0.5 x 3		22	

(a) Day 1 is day of first injection of Prostigmin.
(b) There were special indications for treatment in cases at 35, 33, 23 and 34 days
(c) In these cases, time of next flow is of no significance since another course of Prostigmin or some other type of therapy preceded the next flow.
(d) Ninety-one days after flow induced by estrogen and progesterone, but nine months after latest spontaneous flow at sea level. Advised to return to original altitude.

who also had amenorrhea on other occasions, 8 cases who had definitely shorter intervals, then adjusted without treatment, 2 cases of relatively minor irregularities, and 1 case of hemorrhaging so extreme that the woman required repeated transfusion and uterine curettage, resuming normal menstrual pattern only after continued thyroid therapy at her original altitude.

3. *Increased dysmenorrhea.*

This occurred in ten episodes in five women and was usually noted only during the first flow after altitude increase. However, in some women this happened at the time of each alteration of altitude.

4. *Decrease in dysmenorrhea.*

This change was noted in nine women, four of whom showed additional menstrual variations at the time of coming to school. In this group the degree of menstrual pain was relatively constant at the new altitude.

I B. Two subjects made an altitude decrease of more than 2,000 feet. One experienced a period of amenorrhea which responded to Prostigmin therapy and one had menses twice a month for the seven months of observation despite treatment for hypothyroidism.

II A. Twelve patients with previously abnormal menstrual histories made an altitude increase of over 2,000 feet; in ten cases the increase was 4,500 feet or more. In most cases there was irregularity and infrequency of flow similar in degree at home and at school. Three women experienced menstrual delay much greater than previously noted. One woman flowed every two to six months at sea level but flowed regularly every month for six months at 5,350 feet without treatment.

II B. Two women with irregular and infrequent menses prior to an altitude decrease of at least 2,000 feet reported more regular flows in the new situation.

TABLE II

Summary of 17 Cases (27 Episodes) of Altitude(?) Amenorrhea Not Treated With Prostigmin

Basal Metab. Rate	Case No.	Age at Onset of Study	Thyroid Therapy at Time of Amenorrhea	Duration of Amenorrhea: Days	Next Menstrual Period			Remarks
					Without Therapy	After Contd. Adequate Thyroid Therapy	Immediately After Stated Altitude Change	
+10% to −10%	15	18	—	60	X			Next flow lasted 19 days
	16	25	—	36	X			
	17	17	—	52	X			
	18	17	—	72	X			
	4	20	—	49	X			1946
Below −10%	19	17	0	114	X			
	20	24	0	90	X			
	21	18	0	150			Incr.	
			0	60			Incr.	3 consecutive flows
			0	60	X			
	22	19	Adeq.	180		X	Decr.	1947
			Adeq.	180		X		1949
	23	19	Adeq.	131		X	Incr.	Consecutive flows
			Adeq.	130		X	Decr.	Then regular 3 mos. at lower alt.
			Adeq.	60		X	Incr.	Then these consecutive flows.
			Adeq.	40		X	Incr.	
	24	18	Inad.	60	X			
	25	19	0	180	X			
			0	180	X			
			0	180	X			
			0	180			Incr.	
	26	20	Inad.	60	X			
	27	18	0	120	X			1949
			0	55	X			1950
	8	17	0	90			Decr.	October 1948
	10	18	0	75				Flowed after estrogen. 1950
Unknown	28	17	—	60	X			Next flow lasted 14 days

Physical examination of these 64 women showed few significant findings. There was one case of congenital heart disease. Twelve girls had acne vulgaris; in two it was severe. Four girls were more than 15 per cent overweight by standard tables.[11] An equal number were more than 15 per cent underweight. At the completion of the study each patient's chart was reviewed to see if some systemic disease might have affected menstruation, but none was found.

Pelvic examinations were essentially normal in 25 patients of group I and in 9 of group II. Basal metabolic rates were determined for 46 women in group I. In 23 women the rate was below −10 per cent and in 14 it was below −15 per cent. In group II, 7 of 11 cases tested had basal metabolic rates below −10 per cent.

Hemoglobin and red count values were compared with the standards established by Andreson and Mugrage[12] as normal for Colorado. The lower limits of normal for women were 12.5 grams hemoglobin and 4,300,000 red cells. One woman had borderline values of 12.7 grams hemoglobin and 4,290,000 red cells. A second subject had 11.5 grams hemoglobin originally and after iron therapy had 14.1 grams hemoglobin and 4,700,000 red cells. It is believed that these slight variations did not contribute to the occurrence of the amenorrhea which was the presenting symptom in these two women.

Vaginal smears for estrogenic activity were made in 19 cases, 15 of which were normal. The subjects who had some abnormal smears each had a normal result on at least one occasion.

DISCUSSION

It is generally accepted that change of mode of life can disturb menstrual patterns and it is evident that the women in this series, most of them freshmen in college, experienced such a change simultaneously with the initial altitude change. A suitable series of control cases was not available for comparison. Some of the reported disturbances could have occurred without altitude changes. However, when the same menstrual pattern occurred repeatedly in the same woman after repeated altitude changes at a time when the initial adjustment of entering school had been made, one seemed justified in concluding that the altitude change was the significant factor. Although pelvic examinations of young college women with previously normal menses will usually prove to be normal, it is regrettable that pelvic data are not available for all cases here reported. It is not known how many women in the student group had menstrual abnormalities and failed to report to us for medical care. Thus no statement can be made as to the incidence of menstrual deviation after altitude change.

The use of Prostigmin in the diagnosis and therapy of secondary amenorrhea has been amply reported in the literature.[13] A series of three daily injections of 0.5 mg. or 1.0 mg. is given. The series is interrupted if definite flow supervenes but spotting is ignored. Many cases flow within three days after the third injection (day 6 in the tables). Response occurs in 95 per cent of patients who do not have pregnancy, endocrine imbalance or local pelvic pathology.[14] Abortion has not been reported to occur after Prostigmin. In fact, Soskin et al[15] in the original description of this test reported first a group of rats where Prostigmin did not interrupt known pregnancies and later 23 women who received 1.0 mg. of Prostigmin on three successive days with no resultant flow nor harm to pregnancies.

Prostigmin inhibits cholinesterase, favoring hyperemia in the uterus, which probably explains the prompt flows after prostigmine. It has been said[15] that menstrual delay due to emotional, environmental and similar factors is caused by lack of vascular response and not by any endocrine mechanism. Such amenorrhea should respond to Prostigmin and it does. There is also some work[16] to indicate that Prostigmin acts on the anterior pituitary causing a release of luteinizing hormone so that a corpus luteum is formed and later degenerates leading to a flow as late as the twelfth or fifteenth day. In the tables the flows which began later than the sixth day are listed as failures to respond. That is, they did not show the vascular response.

The small dose of Prostigmin was preferred because it caused no unpleasant side-effects. In the few instances where 1.0 mg. doses were given after failure with 0.5 mg. doses, there were no responses. Mild abdominal cramping or dizziness may result from the larger doses. There were no other ill effects.

One of the questions in initiating this study was whether amenorrhea presumably due to altitude change would fall in the environmental and vascular group or whether it might be brought about by temporary endocrine changes at the unaccustomed altitude. It would seem that the response of these cases to Prostigmin places them with the other environmental amenorrheas.

As a practical method of studying cases of amenorrhea after altitude change and/or other environmental change, the use of Prostigmin is suggested as a safe, convenient, reasonably accurate test to divide cases into:

1. Those who flow by the sixth day and are thus reassured and usually need no further study, and
2. Those who do not respond and so need, and are more apt to accept, further study which should include as a minimum both basal metabolic rate determination and pelvic examination.

The basal metabolic rate determination is subject to various inaccuracies of course, but is still the test of most universal availability in considering possible thyroid dysfunction. One source of confusion is the use of different "normal" values for calories per hour per square meter for the various ages. It is not the purpose of this paper to enter into that discussion. The literature would be clearer if everyone stated what prediction standards he used. Proponents[17,18] of widely varying standards state that a high percentage (or 87 per cent) of normal people have a basal metabolic rate between +10 per cent and −10 per cent and a very high percentage (or 100 per cent) fall between +15 per cent and −15 per cent by their method.

It is necessary to consider whether the altitude of 5,350 feet had an effect on the basal metabolic rates of the subjects herein reported. The studies of Lewis, Iliff and Duval[19] included 90 basal rate determinations on 43 young women residents of Denver (altitude 5,280 feet). These were compared with studies done 2,000 feet higher and 2,000 feet lower. No consistent effect of altitude was noted. In an earlier study these same workers had determined basal metabolic rates on the same subjects at 910, 5280, and 8720 feet using the same technicians and apparatus. They found no sigificant variation with altitude.

SUMMARY AND CONCLUSIONS

(1) This study, done at an altitude of 5,350 feet, presents menstrual histories for 64 college women who had made an altitude change of at least 2,000 feet and who reported for care because of menstrual disturbances. The 48 cases with previously normal menses exhibited no uniform pattern immediately after an altitude increase. While secondary amenorrhea was the commonest finding, there were examples of deviation in either direction as regards interval, amount of flow or pain. Cases frequently showed a change in more than one respect.

(2) Amenorrhea following altitude change apparently follows the pattern of other environmentally-induced amenorrheas. Prostigmin is a helpful agent for combined diagnosis and treatment of these cases. The "treated" cases of amenorrhea had an average duration of 56 days before use of Prostigmin and tended to flow on the third day of this therapy in the absence of a low basal metabolic rate. The "untreated" cases of amenorrhea showed spontaneous flows after an average interval of 100 days.

(3) Basal metabolic rates were found to be low approximately half the time when considering cases or episodes of amenorrhea, or cases with menstrual disturbances of all types after altitude change. It is possible that a thyroid deficiency which is not attended by menstrual abnormalities at a low altitude may render such patients unusually susceptible to the disturbing influence of a change to a higher altitude.

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COMING IN THE JULY ISSUE . . . .

"Experimental Atherosclerosis," a new medical sciences review, especially prepared for The Journal-Lancet by Louis N. Katz, M. D., J. Stamler, M. D., R. Pick, M. D. and S. Rodbard, M. D. of the cardiovascular department, Medical Research Institute, Michael Reese Hospital in Chicago. Dr. Katz is president of the American Heart Association.

Ecoptic Pregnancy and Attempted Criminal Abortion

Report of a Case

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This case may be considered unique in several respects. First, this woman with an oviducal pregnancy was subjected to curettement of the uterus by an abortionist at approximately the twelfth and the sixteenth weeks of gestation. Second, the oviducal pregnancy of approximately eighteen weeks' duration — the embryo measuring 9.0 cm. in length — was unruptured. Third, despite the complications of oviducal pregnancy, a pyosalpinx on the opposite side, two uterine curettements by an abortionist, and the availability of only one of the sulfonamides as an agent to combat the pelvic infection, the patient had a comparatively uneventful recovery from surgery consisting in subtotal hysterectomy and bilateral salpingo-oophorectomy.

REPORT OF A CASE

Mrs. H. F. E., a white woman, age 31, was first seen by the author August 15, 1941. She gave the following history: Her last regular menstrual period had occurred four months before, April 18 to 22. On May 25 and 26 vaginal bleeding for only a day and a half occurred. She commented that she suspected she was pregnant about April 18 as her breasts were tender and sore and she had cramplike pains in the lower part of the abdomen. There was no menstrual bleeding in June. On July 9 an abortionist curetted the uterus, which was followed by continuous vaginal bleeding, moderate in amount but necessitating three to four pads daily, which had persisted. She also had continuance of rather severe, cramplike pain across the whole lower part of the abdomen, radiating to the back and down the inner aspects of both thighs to the knees. Periodically she had noted blood-streaked sputum. At the beginning of August the pain had become increasingly severe, and was localized more to the left lower quadrant. Dysuria appeared, with difficulty in starting the stream; nausea and vomiting occurred intermittently. To relieve the pain, she had taken 40 to 50 Anacin tablets daily. On August 6, because of continuing pain and bleeding, she returned to her abortionist who said he was unable to explain the symptoms. He said he had made a Friedman test, but did not inform her of its results. However, he again curetted the uterus. The pain, bleeding and other symptoms continued, and she was about to visit the abortionist again, but a friend intervened and suggested she consult someone else.

The patient's menses had begun at 15,[1] with regular seven-day periods every twenty-eight days until four years before when they decreased to four days. She had dysmenorrhea only the first day of the periods. There had been one pregnancy several years before; the baby was born prematurely and lived twenty months.

Significant symptoms, in addition to bleeding and pain, were poor appetite, nausea at sight of food and vomiting at intervals. The patient had lost 18 pounds in weight during the previous six weeks. Elimination became impossible without enemas; now and then catheterization was necessary in order to void.

The patient appeared not to be acutely ill but was apprehensive and concerned. Her temperature was 99°, pulse 90 and respiration 24. Blood pressure was 94 systolic, 64 diastolic. A bilateral, slight, smooth, symmetrical enlargement of the thyroid was noted. Breasts were engorged and tender, and secretion could be expressed from both nipples. The lungs were resonant throughout.

The abdomen was exquisitely tender from the level of the umbilicus downward, and palpation elicited resistance suggestive of a mass in the suprapubic region and another mass in the left lower quadrant. Vaginal secretion was alkaline (pH 6) and trichomonas infection was present. Pelvic outlet was parous, cervix was fairly soft and eroded on the posterior lip. Manipulation to both the right and left sides produced considerable pain. The corpus uteri was placed anteriorly and was pushed to the right; it seemed softened and was enlarged and painful to palpation. A mass in the left adnexal area extended almost to the umbilicus.

Urine was within normal limits, both chemically and microscopically. Erythrocyte sedimentation rate (Westergren) was 128 (normal 12); hemoglobin was 12.9 g. (76 per cent) Sahli; color index was .95. The blood cell count was 4,080,000 erythrocytes and 11,000 leukocytes with 78 per cent neutrophils and 16 per cent lymphocytes; there was moderate toxic change of the leukocytes.

A diagnosis of left-sided extrauterine pregnancy and subacute pelvic peritonitis was made and the patient was hospitalized immediately. On admittance her temperature was 99.4°, pulse 112; respiration 24; and blood pressure 94 systolic, 64 diastolic. Sterioradiographs of the chest were within normal limits.

Surgery was scheduled but was postponed because her temperature rose to 101.6° and pulse to 120. Respiration and blood pressure were unchanged. Conservatism seemed indicated temporarily in the presence of the obvious pelvic infection. Sulfathiazole was admin-

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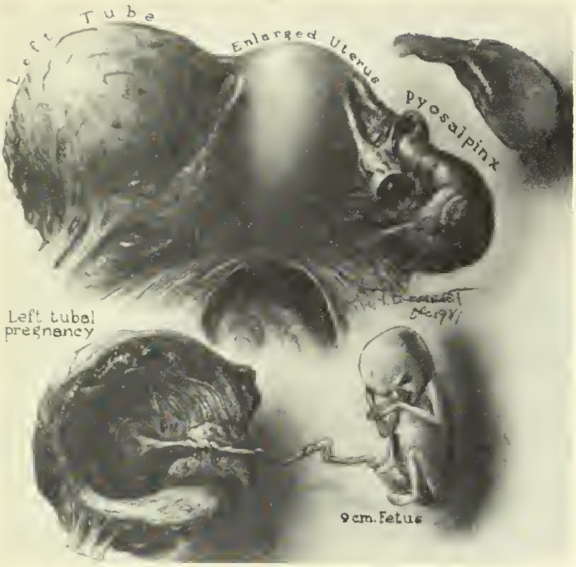

Fig. 1. Shows left tube pregnancy, with enlarged uterus, and 9 cm. fetus.

istered, 1 g. every four hours. The Fowler position was maintained. The patient was placed on a soft diet. Elimination was aided by low enemas. Ice bags were placed on the lower part of the abdomen. Her pain was controlled with tablets of Empirin compound and codeine. Conservative management was continued for seven days. The Friedman test was positive. Erythrocyte sedimentation rate continued to increase. Leukocyte count decreased to 6,500; erythrocytes dropped from 3,860,000 to 2,950,000 within a 24 hour period and hemoglobin from 68 to 51 per cent. The patient was given a transfusion of 500 cc. of whole blood, and surgery followed.

On opening the peritoneum the corpus uteri was noted to be in an anterior position, deviated to the right; it was twice normal size and softer than normal. In the region of the left adnexa, and intimately related to the corpus, was a hemorrhagic mass about 10 to 12 cm. in diameter. The rectosigmoid was displaced upward and was intimately attached to the superior aspect of this mass. The right oviduct and right ovary were injected and edematous and formed a mass which was bound down to the posterior surface of the broad ligament. The fimbriated end of the right oviduct was closed. Surgery consisted of a subtotal hysterectomy and bilateral salpingo-oophorectomy. Sulfathiazole, 12 g., was placed in the pelvis.

The left adnexal mass was an unruptured oviducal pregnancy; the embryo was 9.0 cm. in length. The right oviduct contained purulent fluid; the microscopic diagnosis was chronic salpingitis.

Postoperative morbidity was severe for only a few days, during which time the patient was given additional transfusions of whole blood. She was discharged from the hospital on the eleventh postoperative day. Her temperature, pulse and respiration were normal.

DISCUSSION

This case illustrates some of the inherent dangers of criminal abortion. Indeed this patient was fortunate to have survived.

In retrospect, she presented the cardinal symptoms and signs of ectopic pregnancy: a "missed" period followed by vaginal bleeding associated with cramplike lower abdominal pain, occasional nausea and vomiting, swollen tender breasts, and the presence of a unilateral adnexal mass. The concomitant infection was not surprising in view of the two attempts at abortion, although the possibility that chronic pelvic inflammatory disease may have been present prior to conception cannot be excluded.

Once a diagnosis of ectopic pregnancy is made, immediate surgery is indicated. In this instance, however, with the patient hospitalized and under constant surveillance, and since the ectopic pregnancy had not ruptured, it seemed wiser to treat the pelvic infection before undertaking surgery. The only chemotherapeutic agent available at that time (1941) was one of the sulfonamides; this was given. The well established routine of management of acute or subacute pelvic inflammatory infection was followed.

In the presence of a ruptured extrauterine pregnancy, multiple procedures, as a rule are to be condemned. In this case it was possible to remove the left adnexal mass containing the pregnancy intact and therefore it seemed rational, at this time, to remove the right oviduct – a pylosalpinx. The question of ovarian conservation was considered but the impossibility of preserving the left ovary is well demonstrated in the accompanying illustration. The potentiality of rupture of the oviduct combined with inherent technical difficulties precluded salvage of the right ovary.

SUMMARY

An unusual case is presented of a woman with an unruptured extrauterine pregnancy of larger than average size who had undergone two attempts at criminal abortion and in whom a pyosalpinx was present on the opposite side. Exceptional too was the duration without rupture of the tubal pregnancy.

Endometriosis[*]

F. J. HOFMEISTER, M.D., F.A.C.S. and L. R. GRINNEY, M.D.
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MYSTERY continues to surround the complex and controversial subject of endometriosis. Most physicians admit the existence of this interesting condition characterized by the presence of ectopic endometrium, in most instances identical with that of the uterus. In fact, to fulfill all requirements, this tissue must be surrounded by the same stroma as the normal endometrium, and react in the same way, even to the decidual reaction of pregnancy. However, even with this admission and agreement, there follows a variety of thoughts and opinions concerning its etiology, its identification, and the manner in which it should be treated.

ETIOLOGY

Volumes have been written theorizing on the etiological factors of the disease. Brooks Ranney[1] has summarized the most important of these in his masterful treatise, *The Etiology of Endometriosis*. Te Linde and Scott[2] state that only two theories have withstood the tests of time and investigation — Sampson's theory and the coelomic metaplasia theory. The nutritional factor has been supported by men like Allen[3] of Chicago. Meigs[4] feel that the failure of society to encourage early childbearing is a great factor in the development of this condition. Both imply that social status influences its existence, one intimating that the picky dieting type of individual is more vulnerable; the other stating that the college graduate pressed by finances puts off childbirth with resulting development of endometriosis. It is suggested that endometriosis is a disease of the upper and middle classes and consequently is rarely found in the charity hospital. In our own area this seems borne out by the fact that at the Milwaukee County Hospital there were no cases of endometriosis recorded for the year of 1948 and 5 cases reported in 1950. On the other hand, W. V. Cavanaugh, M.D.[5] studied 646 proved cases of endometriosis at Sloane hospital, New York City, and stated among his conclusions:

1. "Endometriosis is slightly more common in the unmarried after the age of 30."
2. "There is no evidence of an increased frequency of endometriosis in private patients, as compared to ward patients coming to laparotomy."
3. "There is no difference in the distribution of pregnancies through the first five year periods of marriage, i. e., no tendency in future endometriosis patients to delay pregnancy after marriage."
4. "There is no evidence from this series to support the thesis that endometriosis results from voluntary delay of pregnancy or is related to economic conditions."

Almost all students of endometriosis are impressed with the high degree of sterility associated with external endometriosis, but feel that the internal form is no hindrance to fertility and is found rather frequently in the fertile multiparous woman. Meigs[6] has reported that mild adenomyosis is more common in women who have had multiple pregnancies. Ranney[1] states that if pregnancy is a factor in the development of adenomyosis, it still is not known on what basis, mechanical or hormonal, or both.

In the overall series of cases reviewed at Milwaukee Hospital, a private institution, there were 460 known cases of endometriosis which were proved at laparotomy during the three year period from 1948 to 1950 inclusive. As can be seen in table I, there has been a seeming marked increase during this period. Probably this is only a relative increase due to previous failure in

TABLE 1
An Analysis of Internal and External Endometriosis in 460 Cases

Year	Internal	External	Internal and External	Total
1948	—	93	8	101
1949	65	103	12	180
1950	56	96	27	179
	121	292	47	460

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[*] From the Department of Obstetrics and Gynecology, Milwaukee Hospital and Marquette University, Milwaukee, Wisconsin.

Read at the meeting of the Minnesota, Wisconsin, North Dakota and Iowa obstetrical societies, Dec. 1951 pathological diagnosis. It should be noted that in 1948, there were no diagnosed cases of adenomyosis, but it is questionable whether this can be accepted as indicating none existed.

Table II demonstrates the incidence of endometriosis as compared to the total number of laparotomies performed during these years.

TABLE II
Incidence of Endometriosis in Abdominal Operations Performed at Milwaukee Hospital

Year	Majors	Endometriosis Number	Per cent
1948	923	101	10.9
1949	855	180	21.0
1950	931	179	19.2

Table III reveals that the greatest number of cases of external endometriosis are found in the group from 30 to 39 years of age. Internal endometriosis is most frequently found in the 40 to 49 year age group. This agrees with the opinion of Frankl.[7]

TABLE III
Age Incidence in the Milwaukee Hospital Group

Age	Endometriosis Number	Per cent	Adenomyosis Number	Per cent
10 to 19	1	.3	—	—
20 to 29	77	23.1	2	1.1
30 to 39	133	39.8	31	19.0
40 to 49	105	31.4	92	54.7
50 to 59	18	5.4	39	23.2
60 to 69	0	0	4	2.3

Of interest concerning fertility in relation to endometriosis are the following two tables which reveal that 62.4 per cent of the patients operated for external endometriosis had been pregnant from one to five times before the symptomatic condition required surgery. The known sterility problem associated with these cases was 23.2 per cent. As would be expected, 82.2 per cent of the cases operated for adenomyosis had been previously pregnant, with an incidence of known sterility in 6.9 per cent. A group of 93 of these patients was further analyzed and 84 of these or 89.3 per cent had been pregnant before developing symptoms requiring treatment. Fourteen or 15 per cent were known sterility problems.

TABLE IV
Incidence According to Marital and Pregnancy Status

Status	External Endometriosis Number	Per cent	Internal Endometriosis Number	Per cent
Single	46	13.6	10	6.0
Married	293	86.4	158	94.0
Patients pregnant	183	62.4	130	82.2
Single	79	32.2	33	25.4
Multiple	104	56.8	97	74.6
Patients never pregnant	110	37.5	28	17.7
Known sterility problem	68	23.2	11	6.9

TABLE V

	Number	Per cent
Infant previous to symptomatic operation	84	89.3
Infertility	14	—
Pregnant after operation	7	50.0
Aborted	2	0

These figures are presented with the question as to whether pregnancy itself might not be a factor influencing the formation of endometriosis. Certainly pregnancy has a quieting effect upon the severe symptoms often associated with this condition, but within the last month three patients, previously diagnosed as cases of early endometriosis, have returned after a short period of relief following pregnancy. The symptoms were more severe than before pregnancy, and the time since the birth of the child was not more than six months. They had been encouraged to consider relief of from two years to five years possible after pregnancy with a rare chance of its being permanent.

DIAGNOSIS

What hope can be held for the patient with the preoperative diagnosis of this condition? Many still hold, as previously taught, that endometriosis is usually an accidental finding at the operating table, or at best diagnosed preoperatively in about 20 per cent of cases.[8,9] The following tables indicate that in the overall series of 460 cases a preoperative diagnosis of external endometriosis was made in 51 per cent, internal endometriosis in 8 per cent, and combined external and internal in 21 per cent. In the 93 cases attended by a single gynecologist, the external type was diagnosed preoperatively in 74.6 per cent of the instances. As in the overall

TABLE VI
Incidence of Preoperative Diagnosis in Hospital Series

Condition	Per cent
External endometriosis	51
Internal endometriosis	8
Internal and external	21

TABLE VII
Incidence of Preoperative Diagnosis in Private Series

Condition	Number of cases	Per cent
Total external endometriosis	79	
Preoperatively diagnosed	59	74.6
Postoperatively diagnosed	20	
Total internal endometriosis	17	11.7
Postoperatively diagnosed	15	

series, internal endometriosis was diagnosed accurately in only 11.7 per cent of the cases. This is probably due to the fact that adenomyosis is found in association with pathology, making it a secondary consideration.

How is accurate diagnosis made preoperatively? The history, the keystone of the entire clinical picture, will reveal the predominant symptoms of external endometriosis to be increasing dysmenorrhea, abnormal bleeding, and backache. The predominant symptom in the internal type is abnormal bleeding in the form of menorrhagia. The real secret of diagnosis lies in the recto-vaginal-abdominal examination, as shown in figure 1.

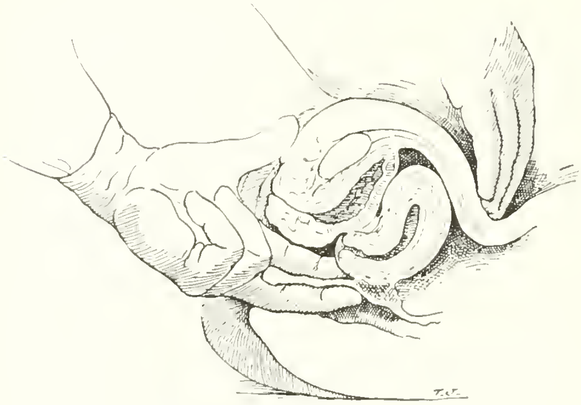

Fig. 1. Recto-vaginal-abdominal examination for menorrhagia.

Only with this type of examination can the uterosacrals, the posterior uterus, and the ovarian areas be palpated thoroughly. Examinations must be done frequently at well chosen times of the menstrual cycle, such as the day menstruation starts, immediately after it stops, and at mid-cycle. The bladder must be empty, and the patient is instructed to take an enema a short time before coming for examination. Retroversion will be found in 27.8 to 29 per cent of cases. In all cases of external endometriosis, distinct nodulation should be felt, as evidenced by the frequency of this diagnosis in our series.

TREATMENT

Treatment presents no problem in cases of minimal external endometriosis; far advanced external endometriosis; external endometriosis when the family is complete, except in the young patient who must not be made an invalid; and internal endometriosis. In all these situations radical surgery is the treatment of choice. By this is meant total hysterectomy and bilateral salpingo-oophorectomy.

In the young patient and in the patient who is a sterility problem, conservative surgery is a must whenever possible. This is usually difficult and time consuming, and is frequently called nuisance surgery by those who are unfamiliar with the philosophy behind the treatment of endometriosis. Removal of implants both vaginally and abdominally by surgery and cautery, removal of affected portions of the ovaries with careful and accurate repair, suspension of the retroverted uterus with an attempt to peritonealize the raw surface, and a careful attempt to insure tubal patency are the steps necessary to complete a case. All this must be preceded by a thorough dilatation and curettement to reveal any silent intrauterine pathology that might otherwise be missed, and must be determined before the uterus is preserved. Following this type of surgery, 7 of our 14 sterility problems became pregnant. We feel this is a worthwhile result. A sterility problem due to endometriosis is defined as a patient who is seen for treatment, and whose chief complaint is the inability to become pregnant. A complete infertility study must reveal a normal male factor, and a normal female except for the presence of endometriosis. The patient is made aware of the existing condition and told to attempt pregnancy for at least an additional six months. Infertility is usually not recognized as a complaint unless one and one-half to two years of trial have elapsed, or the endometriosis has progressed beyond the minimal stage.

Four of the cases in our personal series of 93 had had previous operations. Of these only one had her initial operation during the period of this study; the others were from previous years. Three of these re-operative cases had x-ray therapy before the second operation. It is our opinion that although x-ray stops the progress of the disease, painful areas often remain that subsequently require removal. X-ray as an initial treatment for endometriosis should, in our opinion, be mentioned only to be condemned. With malignancy as an associated condition in 3.4 per cent of the overall series and 2.1 per cent of the personal cases, x-ray therapy could be a dangerous procedure.

Medical therapy in endometriosis is still the most controversial of all treatments. We feel with Te Linde and Scott[10] that only for those patients requiring treatment but who refuse surgery are stilbestrol and testosterone indicated. Since the effect of stilbestrol[11] on endometriosis is similar to that of pregnancy we have become more skeptical after seeing recurrence in the three cases within a period of six months after pregnancy.

The treatment of choice as of this date is surgery, conservative surgery if possible.

SUMMARY AND CONCLUSIONS

1. A series of 460 endometriosis cases from Milwaukee Hospital is reviewed. This includes 93 cases from a single surgeon which are reviewed for postoperative results.
2. The effect of pregnancy on the etiology of endometriosis is evaluated.
3. The series indicates that endometriosis is a condition which can be diagnosed preoperatively.
4. Surgery is indicated as a treatment of choice.
5. Recurrence of symptoms necessitated reoperation in 4.3 per cent of the cases.
6. Fertility was effected by conservative surgery in 50 per cent of the 14 known sterility problems.

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Meet Our Contributors . . .

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(Continued on page 315)

This department of The Journal-Lancet *is devoted to reports on cases in which all the appropriate diagnostic criteria have been employed, the best known treatment administered and the results recorded. It is desired that these case reports be so prepared that they may be read with profit by physicians in general practice, hospital residents and interns and may be of considerable value to junior and senior students of medicine. This department welcomes such reports from individuals or groups of physicians who have suitable cases which they desire to present.*

Curare in the Treatment of Tetanus

DONALD C. DETERS, M.D.* and
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St. Paul, Minnesota

The following two cases of tetanus are reported because of the excellent therapeutic results obtained by the use of curare in association with other standard treatments of lockjaw.

Hoche[1] was the first to use curare as an adjunct in the treatment of tetanus, making his original contribution in 1894. Cole, Mitchel and West[2] used curarene and crude curare also in the treatment of tetanus during 1934 and 1936. Early preparations varied greatly in potency and response to the drug was unpredictable. However, since the development of refined preparations of curare, biologically standardized, it is possible to predict the effect of the drug upon the patient, and thus to assay its value in the treatment of tetanus.

The drug acts by blocking transmission of nerve impulses at the myoneurol junction, reducing muscle spasm. This in turn brings a marked relaxation in the muscle resulting in great relief to the patient. It is this ability to combat muscle spasm that makes the drug so valuable in lockjaw. Curare alone, however, is not the only drug to be used. Successful treatment must be based upon early diagnosis; use of antitoxin, penicillin, and sedation; control of electrolytic and water balance; and debridement of the infected wound. The relief that is obtained from curare in the patient with lockjaw may be handicapped by development of paralysis of the muscles of respiration, of the tongue, or lastly, because of such relaxation, collection of mucus in the air passages. These dangers, however, may be overcome by the use of Prostigmine. This is the physiological antagonist to curare and should be kept at the bedside constantly when one employs curare in any type of treatment. In addition, should respiration fail as a result of paralysis of the respiratory center, artificial respiration until the Prostigmine effect occurs will be a life-saving measure.

CASE REPORTS

Case 1 is that of a 78 year old man, who was seen on the evening of July 5, 1948 complaining of pain and pressure over the precordium. He had noted some increase in shortness of breath, particularly on exertion, and during that evening he noticed for the first time that he had some difficulty in swallowing. At this time temperature, pulse, respiration and blood pressure were all within normal limits. He had worked during that day in his garden and it was thought by the examiner that he probably was suffering from overexertion. He was given a sedative and advised to rest for a few days in order to regain his strength. The next day, however, symptoms increased in severity and when he was seen at home on the following morning, he had marked trismus with severe abdominal rigidity as well as rigidity of the back and neck muscles. He was restless and complained of generalized aches and pains about his body.

Physical examination revealed a healing sore on the back of the right hand. Nine days before the symptoms developed he had run a sliver into his hand, the area had later festered and drained pus. Following the drainage of pus he had no more symptoms or distress from the sore.

The past and family history are irrelevant to the present discussion.

On the basis of his history, as well as the result of his physical examination, a diagnosis of tetanus was made and he was immediately admitted to St. Lukes' Hospital. By the time of admission, tendon reflexes were markedly hyperactive and he was suffering from severe muscle spasm throughout his body. He was unable to open his mouth. As soon as admitted, the sore on the back of his right hand was excised. After a test for sensitivity to horse serum, he was given 50,000 units of tetanus antitoxin intramuscularly, 20,000 units intravenously, 5,000 units intrathecally and 5,000 units were injected into and around the wound. One hundred thousand units of penicillin were then given intramuscularly every four hours and in addition streptomycin one-half gram was given twice daily. Chloral hydrate in doses of 60 grains in a starch retention enema were needed to control apprehension and restlessness. Because of twitching and jerking one ampule of magnesium sulphate was given intramuscularly six times daily. Adrenalin and elixir Benadryl were given as a prophylactic measure to avoid allergic phenomena from the antitoxin and antibiotics. Twenty thousand units of tetanus antitoxin were given each day intramuscularly. Constant wet packs of peroxide were applied to the site of the wound.

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The laboratory examination on admission revealed white blood count to be 10,400, hemoglobin 12.9 grams, and urine normal. Spinal fluid was normal, and five cells per cu. mm. were found. Smears of spinal fluid and bacteriological investigation was also normal. Material obtained from the wound on the dorsum of the right hand revealed no evidence of gram positive rods.

On the day after admission he developed severe, painful generalized muscle spasm with marked rigidity of neck, back, and abdomen. With onset of increased muscle spasm, 20 units of Intocostrin was given every four hours with marked relief of symptoms. There was almost immediate relaxation of muscles throughout the body and a marked decrease in spasticity of jaw muscles. Dysphagia was less severe, the patient could cough following the use of Intocostrin, and secretions and mucus no longer collected in the throat. Because the patient was unable to take fluids or food by mouth, his nutritional balance and electrolytic balance was maintained by the use of intravenous fluids and vitamins parenterally.

His hospital course was stormy during the first 10 days, and on the tenth day he suddenly developed signs of acute left heart failure which responded to digitalization, restriction of fluid, and low sodium diet plus the use of mercurial diuretics. After an uneventful recovery, he was discharged to his home on the seventeenth day, feeling remarkably well. During the trismus a nursing bottle containing a supernourishing liquid diet was used, giving a tremendous amount of nourishment without much effort. He was seen two months after discharge and has remained completely well since the seizure of lockjaw.

Case 2 is that of a 20 year old woman who telephoned on September 28, 1949 asking for relief of pain in her jaws which had become so tight that she was unable to eat. She was advised to report to the office immediately. On examination there was marked stiffness of the muscles of the jaw, she was unable to swallow, back and abdominal muscles were in marked spasm, and reflexes were hyperactive. Temperature, pulse and respirations were normal.

Questioning failed to elicit the history of a sore or puncture wound and she insisted that she had had no injury, in fact, she said she had been exceptionally healthy during the past several months. Physical examination, however, revealed a hematoma under the base of the right great toe nail. When this was brought to her attention, she remembered that she had bruised the toe when she caught her foot in the rotating brush of a vacuum cleaner some two weeks before. Since it had not caused her any particular distress, she had not bothered to have it treated.

The past and family history are irrelevant to the present illness. She stated that she had never received tetanus vaccination.

On admission to the hospital the toe nail was removed under local anesthesia and a large amount of purulent material was released. Because of the presumptive diagnosis of tetanus, the affected portion of the toe was excised. Following sensitization tests she was given 40,000 units of tetanus antitoxin intravenously, 40,000 units intrathecally, 40,000 units were injected in and around the site of the wound and 40,000 units were given intramuscularly every four hours. At the same time 30 units of Intocostrin was given every four hours intramuscularly. Penicillin in the dosage of 300,000 units was given three times daily, and with the penicillin one-half gram of streptomycin and later one-fourth gram of streptomycin was given every four hours. Chloral hydrate in the dosage of 30 grains in a starch retention enema was given as needed to control restlessness and nervous tension.

Her condition worsened suddenly on the third day, muscle spasm increased greatly, and as a result 60 units of Intocostrin was given intramuscularly in an attempt to relax spasm and to decrease the degree of contractions. Oxygen was administered by mask and suction was used to clear the secretions from the throat. On the fifth hospital day, she developed severe convulsive seizures and increased spasticity of the muscles. Intocostrin was now given every two hours to control the spasms. Suddenly she complained of shortness of breath, diplopia and became extremely weak. It was apparent that she was suffering from a reaction to curare and Prostigmine was given immediately with the immediate amelioration of the symptoms. Artificial respiration and oxygen were used until the Prostigmine should take effect. We later attempted to control the spasms of the muscles by the use of Novocain intravenously, but this afforded no help. Intocostrin was again started with a dosage of 40 units on a p.r.n. basis, and on this regime we were able to control the muscle spasm. Nutrition and fluid balance was maintained by parenteral procedures. Demerol was used to control pain. We gradually decreased the dosage of Intocostrin, and finally, on the twenty-fourth hospital day she was discharged as well.

Two cases of tetanus are reported in which curare was an effective supplement to all other routine measures used in treating this disease.

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This is the eighth in a series of letters to Dr. J. A. Myers and the readers of the JOURNAL-LANCET *from Dr. Ancel Keys, director of the laboratory of physiological hygiene at the University of Minnesota, during a year of study and travel abroad. Other letters will follow in subsequent issues.*

Notes from a Medical Journey

27 April 1952, Shrewsbury, Salop

Dear Jay:

Here in Shrewsbury we are stopping overnight at the Lion Hotel where Disraeli stayed at election time in June, 1841; where Jenny Lind sang in the ballroom on several visits; and where King William IV, Paganini, and Charles Dickens stopped, fiddled, and wrote, respectively, in times past. In the hall there is mounted a piece of a fourteenth-century tomb found in a seventeenth-century chimney recently pulled down, but all this is recent stuff compared with the twelfth-century nave of Hereford Cathedral which we visited briefly a couple of hours ago. We have a growing sense of satisfaction in the continuity of history on every hand here; the ancient farmhouse and the historic abbey alike contribute to a feeling that our culture is not so ephemeral after all, in spite of wars, Russians, and even atom bombs.

We are driving up to Liverpool from whence we embark for Belfast where, on Tuesday, I am to lecture at the Medical School. Tomorrow we have time to divert through North Wales and perhaps to seek out Coed-y-Foel. It was from there that one of Margaret's ancestors, Edward Ffoulke, set out for America one hundred and sixty years ago, slightly encumbered with a wife and nine children. After the Belfast lecture we must dash back to Oxford to change bags and pile the Hillman high with apparatus for our work in Madrid. Friday I give the Holme Lecture at University College, London, and that night, if we successfully break all traffic laws, we should be on the Southampton-Le Havre car ferry en route to Spain.

For the past month spring, in all its English beauty and atmospheric delight, has tempted and beckoned. Alas! I have withstood these soft blandishments; the nose has been firmly pressed to the grindstone of laboratory, library, and typewriter. How stupid are researchers, always setting out on self-imposed schedules far more onerous than would be accepted under dictation from others! But it has been fun seeing the Naples' results emerge from calculation and it was pleasant, on April 9th, to have my Burlington House (London) lecture over-praised. The real sweat was caused by the task of making a study of the blood cholesterol in 48 middle-aged men at Slough (near London). I had given up hope of getting a sample of middle-aged Englishmen when the Ministry of Health and the Industrial Health Clinic of Slough finally decided to get busy. So I burned up the road running back and forth between Oxford and Slough and of nights Margaret and I labored until the small hours until all was done -- in duplicate, with a dozen dried extracts sent by air to Minneapolis for checks. Fortunately, the Ministry provided a careful dietary study or we should have been in a proper mess with the Madrid work coming up.

In spite of rationing, the English diet contains almost as much fat as our Minnesota average, so it is a great contrast to Naples where the percentage of calories supplied by fats is far lower. The Naples diet assumes great interest in view of our serum cholesterol findings there. The essential point of the latter is that the age trend is very different from that in Minnesota. At home -- and apparently the same is true of other parts of the United States -- we found the average serum cholesterol level in clinically healthy men rises steadily from age 18 to the mid-fifties, the yearly increase being about 2.2 mg. per 100 ml. of serum. In our Naples subjects we found much the same from age 18 to the early thirties but thereafter there was no further change, at least into the fifties, which was as far as our age range extended. In this respect, at least, the Neapolitans do not "age" like the Minnesotans. May we connect this fact with the unanimous opinion of the Neapolitan physicians that, except in rich people, they rarely see coronary disease? Well, Madrid should provide more evidence on these problems and I hope we can find means of continuing the work in southern Italy.

Interest in coronary disease and possible etiological factors is mounting here in Britain. I suspect the recently issued vital statistics have more to do with this than my lectures and perhaps more personal considerations are most influential among the doctors. There is a lot of talk about the recent paper in the British Medical Journal, by Dr. J. N. Morris and associates, showing the very high mortality from coronary disease in doctors. The most startling feature of this admirable study is the finding that general practitioners are considerably more susceptible than specialists. We had dinner with the Morrises the other night and debated this long and hard. There are two intriguing possibilities for explanation and each is good for a heated argument in any medical gathering: Perhaps GPs work a lot harder than specialists -- this is proclaimed by the GPs and admitted by all but the die-hard consultants. Or perhaps GPs eat more and fatter food -- and here the specialists nod sagely!

I wish I had time to calculate the results from Slough, but this will have to wait for after hours in Madrid. We already know that young men in London are, in regard to serum cholesterol, much the same as men of the same ages in Minnesota; the recent data of Dr. J. Tanner show a yearly rise of about 1.9 mg. of cholesterol per 100 ml. of serum from age 18 through 30.

Well, there are heaps of things to do, as you can see, but the main job right now is to get to bed and try to repair some accumulated fatigue. I should write to all our friends at home but I hope you will give them my greetings. Congratulations for important new jobs go to Dick Ebert, George Aagaard and Charlie May, but I am sorry that George and Charley are leaving Minneapolis.

As ever,

Ancel Keys

Clinical Evaluation of a New Anti-asthmatic Combination

WILLIAM SAWYER EISENSTADT, M.D.
Minneapolis, Minnesota

ADRENERGIC drugs have been used in the symptomatic treatment of bronchial asthma since 1903. In 1901, Takamine isolated epinephrine from the adrenal medulla, and two years later Bullowa and Kaplan administered the 1-1000 solution subcutaneously for acute paroxysms of bronchial asthma. In 1923, ephedrine was introduced. Its great advantage over epinephrine was its effective, though slower, action when given by oral administration.

Since then, numerous synthetic drugs closely related to ephedrine and epinephrine have been introduced with varying results. Within the past few years a new sympathomimetic amine, N-isopropylarterenol hydrochloride, without the pressor effects of epinephrine, has been used sublingually and by inhalation for bronchial asthma.

A newly developed anti-asthmatic combination,[*] designed to provide immediate as well as prolonged relief of bronchial asthma, has been observed for its clinical effects. The purpose of the study was to determine the overall effectiveness of the single-dose, dual-action tablet combining sublingual and oral administration for the control of acute paroxysms of bronchial asthma.

This product is made up in tablets comprised of an inner core containing 2 gr. of theophylline, ⅜ gr. of ephedrine sulfate and ⅛ gr. of phenobarbital, a combination which has been consistently useful in the symptomatic treatment of bronchial asthma, and a thin outer coating containing 10 mg. of N-isopropylarterenol hydrochloride. The efficacy of N-isopropylarterenol in asthmatic paroxysms has been reported by numerous investigators.[1-5] For prompt initial relief, the outer coating dissolves readily when the tablet is placed under the tongue and may be effective within five minutes. The remainder of the tablet is then swallowed and may afford sustained relief for several hours.

Sixty-two adult asthmatic patients, ranging from 14 to 75 years in age were treated. All were private patients and were personally observed by the author. They were grouped according to the severity of their symptoms, and included 20 patients with mild bronchial asthma, 24 with moderate bronchial asthma, and 18 with severe bronchial asthma. The medication was given as adjunctive therapy to patients who were either starting desensitization therapy or for whom desensitization therapy was inadequate to control their symptoms completely.

Treatment consisted of holding the tablet sublingually for five minutes before swallowing. This was repeated at three to four-hour intervals as necessary.

Of the entire group of 62 patients, 51 patients, or 82 per cent, experienced some measure of relief, and 41 patients, or 66 per cent, had effective relief ranging from good to excellent. Only 11, or 18 per cent, were not relieved of their symptoms. Results in each of the three groups of patients are summarized in table I.

TABLE I
RESULTS IN A GROUP OF 62 PATIENTS

Degree of Relief[*]	*Degree of Asthma*					
	Mild		Moderate		Severe	
	No.	Pct.	No.	Pct.	No.	Pct.
Excellent	8	40	5	21	2	11
Good	10	50	11	45	5	28
Fair	1	5	5	21	4	22
No Relief	1	5	3	13	7	39

[*] Criteria of relief of symptoms are defined as follows: excellent—relief within five minutes; good—relief within five to twenty minutes; fair—moderate relief within twenty to thirty minutes; no relief.

Many of the patients, particularly those with mild or moderate symptoms, noted initial relief within five minutes. This is interpreted as the result of the action of N-isopropylarterenol hydrochloride, since the preparation had its first effects within the time required for complete dissolution of the outer coating and before the tablet was swallowed. The bronchodilating ef-

(Continued on page 315)

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[*] Nephenalin,® supplied through the courtesy of Thos. Leeming & Co., Inc.

Lancet Editorial

Anesthesia and Childbirth

The use of anesthesia in an instance of complicated childbirth is not a controversial issue. There may be some question about its use when the birth clearly is uncomplicated, or for a mother who has had several children previously, none of whom was delivered with the use of anesthesia. Actually, however, the point to be made here is not whether anesthesia should be used or should not be used. That would bring one into conflict with the technic of Grantly Dick Read.

It is perhaps twice as important that anesthesia used in obstetrics be safe as it is that anesthesia used in ordinary surgery be safe, because at childbirth the lives of two people are at stake. In this respect, the use of local anesthesia for blocking the pudendal nerves at delivery is a very desirable method, and probably should be used more than it is. The use of caudal block, and particularly continuous caudal block, has the very great disadvantage that one must be skilled in the technic of inserting the needle. The difficulty is that patients who are in labor too often seem to be obese in the very region in which the needle must be inserted, so that it may be necessary to place the needle several times before it is in the correct area and position. This results in trauma and possibilities of infection, and these patients do not tolerate infection well. There have been serious complications in patients whose caudal canal has become infected after such a procedure.

The use of spinal anesthesia solves a number of problems but also poses some, one of which is postlumbar puncture headache. This is a very real concern to those afflicted with such a headache, and it constitutes a considerable objection to the notion of spinal anesthesia as the method of choice. Inhalation anesthetic agents of course are generally used, particularly ether. In the distant past chloroform was used; more recently the gases have been employed, and now trichlorethylene is being advocated. In the use of inhalation anesthetic agents it has to be remembered that it is not always possible at the time of delivery to have enough personnel available, which may mean that if the mother has been deeply anesthetized and the baby is apneic when delivered, pulmonary ventilation probably will have to be used for the infant to rid the circulation and nervous system of the anesthetic agent.

The use of morphine during the period of labor introduces the same hazard as that which has just been mentioned; namely, that when the mother has received morphine, the newborn infant is much more likely to be apneic than if morphine had not been used. Rectal anesthesia has had considerable trial in childbirth. It is of value in certain cases, but its efficacy depends much on the experience of those who are using it.

Generally speaking, in respect to anesthesia for childbirth, as in anesthesia for any other condition, one needs to be aware of all the factors in a given case and to recognize the indications for, and contraindications to, use of the various anesthetic agents and methods available. A subject so complicated cannot be dealt with in technical detail in an editorial, but it is of importance to recognize that today we have so many agents and methods and so many individuals who are well trained in the use of them that when anesthetics are to be used for delivery it is now possible to use them with confidence.* Another aspect of the problem is the fact that the Bloxsom air-lok has again revived widespread interest in pulmonary ventilation in the newborn. Despite the controversy that has attended its use, it would seem that its introduction into practice will aid greatly in stimulating investigation of resuscitation of the newborn. Such an investigation would be eminently worth while.

John S. Lundy, M.D.,
Section on Anesthesiology,
Mayo Clinic, Rochester, Minnesota

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*Knight, R. T.: Relief of pain in surgical operations and obstetrics. Journal-Lancet 72:72, 1952.

BOOK REVIEWS

★

Group Treatment in Psychotherapy, by ROBERT G. HINCKLEY, M.D and LYDIA HERMANN. 136 pages. Minneapolis, Minnesota: University of Minnesota Press. $3.00.

In this compact book, a psychiatrist and a psychiatric social worker record the experience of a decade of the use of group psychotherapy within the framework of the mental hygiene program of the University of Minnesota Health Service.

Here is a fairly specialized example of group therapy limited because of the nature of campus population — a youthful and narrow age range, a limited time of residence, a selected intelligence level and some similarity in cultural and social backgrounds.

The authors describe a variety of groups formed—the first one for the purpose of aiding social adjustments, and others on the basis of similar somatic symptoms, such as epileptiform seizures, neurodermatitis and primary hypertension. Within the last three years 27 groups have been organized and interest has increased. The procedure has involved individual psychiatric interviews to supplement and support group therapy wherever the psychiatrist felt this advisable.

The book sets forth the goal sought in group psychotherapy and gives a detailed description of the procedure within a group, the aid individuals give one another and the support offered by the therapist. The use of verbatim records of group discussions clarify and add interest to the explanation.

This book should be a useful addition to the library of any person desiring to understand the dynamics of group psychotherapy. It also should stimulate incorporation of this technique into other campus mental hygiene programs.

M.T.M.

•

Hope and Help for the Alcoholic, by HAROLD W. LOVELL, M.D., 1951. New York: Doubleday. 215 pages. $2.75.

Dr. Lovell treats alcoholism as a medical problem and his discussion would be patterned similarly were he considering tuberculosis or any other medical condition. Alcoholism is defined as "a condition characterized by uncontrolled compulsive drinking." It is further discussed as a serious progressive disease which somewhat resembles the ailments of faulty body chemistry such as diabetes, the allergies, such as hay fever, and drug addiction."

An individual's tolerance to alcohol is influenced by many factors such as food, fatigue and experience in drinking. The difference in capacity is conditioned partially by the efficiency of the adrenal and pituitary glands. Dr. Lovell makes an interesting analogy between diabetes and alcoholism, with similarities in their emotional and physical aspects.

•

The Annual Report on Stress, 1951, by HANS SELYE, M.D. Montreal: Acta 8. $10.00.

This report on stress for 1951 represents the first of a series of annual supplements to his book "Stress — the Physiology and Pathology of Exposure to Stress," published in 1950. The present volume follows closely the form originally developed in the 1950 volume.

The three main parts include an initial discussion of the general physiology and pathology of stress, an account of the physiologic and pathologic changes in each organ system, and functional tissue under stress, and a concluding synthesis of a unified theory of medicine. There is a well organized bibliography of more than 3000 references.

Dr. Selye's personal authorship of the text enlivens the presentation in a stimulating way but permits intensive emphasis upon only one interpretation of the facts. Endocrinologic aspects of stress are analyzed critically and with skill, while discussion of other aspects gives the impression, erroneous to be sure, of wholehearted uncritical acceptance of many statements from the literature.

The present volume and the series planned for the future will form an essential part of any medical library and stand as a tribute to the talents and scholarship of its distinguished author. J.T.F.

Marriage, Morals and Medical Ethics, by FREDERICK L. GOOD, M.D., L.L.D. and REV. OTIS F. KELLY, M.D., 1951. New York: P. J. Kennedy & Sons. $3.50.

A presentation of the medico-moral problems relating to marriage, this book is intended as a guide to physicians, nurses, social workers and priests in counselling those whose medical problems have a bearing on moral concepts. The authors, one a gynecologist and obstetrician, and the other a psychiatrist and ordained priest, discuss in simple, clear language the fundamental principles of morality and Christian marriage, followed by considerations of the ethical and physiological phenomena of sex, conception, pregnancy and labor. Such subjects as the Rh factor, regulation of conception, artificial insemination and psychiatry are evaluated in the light of ethical principles. M.M.K.

•

Physical Medicine and Rehabilitation for the Clinician, edited by FRANK KRUSEN, 1951. Philadelphia, London: W. B. Saunders Company. 371 pages. $6.50.

The material in this book was prepared originally for the lecture series for the American College of Physicians, and therefore emphasizes clinical problems without giving tedious technical descriptions to the applied modalities. The book is a joint enterprise of several contributors, each an outstanding authority in his field. The chapter on functional anatomy by Hollinshead is worthy of special attention.

It is a book which should be on the desk of every clinician regardless of his specialty, making it handy to consult in everyday practice. M.M.D.

•

Trends in Gerontology, by NATHAN W. SHOCK, Ph.D., 1951. Stanford, California: Stanford University Press. 153 pages. $2.50.

This gives a quick review of gerontological development over the past ten to fifteen years, focussing upon the activities in this country but including highlights of efforts abroad. The field is divided into the following areas: population, income maintenance and retirement, health maintenance, living arrangements, education, community programs for the aged, research, research potentials, methods of furthering research and recommendations.

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American College Health Association News . . .

THE BOSTON MEETING

The 30th annual meeting of the American College Health Association may very well have set the tone for a new era in Student Health Service practice. Our founders would undoubtedly be proud of those who proved at this meeting that high class clinical medicine is miscible with the other functions of a successful college program. It was amply and forcibly demonstrated by participating deans, counsellors, professors and physicians that each had something to contribute, often to one another, in the important task of turning out a better end product, the college graduate.

Max L. Durfee, M.D.

The success of this meeting was due in no small part to the wisdom and foresight of Dr. John E. Sawhill, our immediate past president. His on-the-spot lieutenants, Dr. Dana Farnsworth, chairman of the committee on arrangements, Dr. Thomas V. Urmy, chairman, and the rest of the program committee, Drs. Monks, Hunter and Anthonisen, left nothing undone to insure success of the meeting, both socially and professionally.

The challenge is squarely before the Ohio Section and we shall deliver to the best of our ability. We invite suggestions from everyone on how to make our next meeting another outstanding one.

Max L. Durfee, M.D., *President*

* * *

The total registration at the thirtieth meeting was 162 persons, representing 94 colleges and universities and six agencies such as the American Association for Health, Physical Education and Recreation, the National Tuberculosis Association, and the Maine State Department of Health. This compares with 185 registrants at the Chicago meeting last year.

Attendance of institutions by sections was as follows:

Canadian	2	North Central	5
Illinois	6	Ohio	4
Indiana	0	Pacific Coast	3
Michigan	5	Pennsylvania-NewJersey	10
Mid-Atlantic	8	Rocky Mountain	3
Mississippi Valley	2	South Central	4
New England	16	Southern	3
New York	11	Southwestern	3

* * *

A service award was presented to Dr. Warren Forsythe, University of Michigan, in recognition of his years of service to this association. The award was a gavel made of wood from Old University Hall at Ann Arbor.

* * *

Sixteen colleges and universities were accepted for membership at the annual meeting in Boston. The two not previously reported in this column are:

Brandeis University, Waltham, Massachusetts, with Robert J. Cataldo, M.D., in charge. Personnel of the University Health Office include two part time physicians and three full time nurses. The university has an enrollment of 640 undergraduate men and women students.

Midland College, Fremont, Nebraska, with Dorothea Mortensen, R.N., in charge of the Student Health Service. The 347 men and women undergraduate students are served by one part time physician and one part time nurse.

* * *

The officers elected for the year 1952-1953 are:

President: Max L. Durfee, M.D., Oberlin College.
President-elect: Dana Farnsworth, M.D., Massachusetts Institute of Technology.
Vice-president: Leona Yeager, M.D., Northwestern University.
Secretary-treasurer: Edith M. Lindsay, Ed.D., University of California at Berkeley.
Council-at-large for a three year term: John P. Monks, M.D., Harvard, and Paul L. White, M.D., University of Texas.

* * *

Dr. Earl B. Erskine, Director of the Health Service at the University of Illinois, invites members of the American College Health Association in attendance at the American Medical Association meeting in Chicago to use the Navy Pier Branch of the university as a home port. Headquarters will be the Health Service lounge located on the third floor, Room 313.

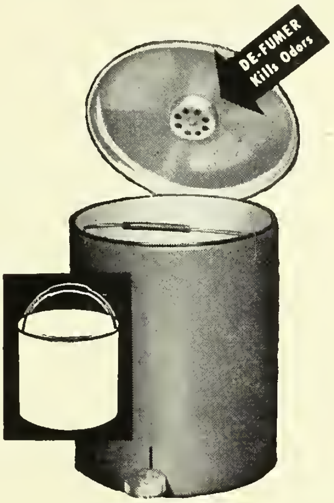
* * *

The South Central and Rocky Mountain sections had a combined sectional meeting at the University of Nebraska on May 4 and 5, 1952. The thirty-eight persons in attendance represented twenty colleges and universities, two county health departments, and the U. S. Public Health Service.

The two section presidents, namely, R. W. Lafene, M.D., South Central, and Frank Robertson, M.D., Rocky Mountain, made some opening remarks, which were followed by a brief resume from member colleges of existing problems and significant programs at the respective institutions. Dr. Lewis Barbato, psychiatrist at the University of Denver, spoke on the topic: "Mental Health in Colleges."

A panel on "Preventive Medicine in Colleges" discussed the sub-topics of: the entrance physical examination, policy of psychiatric services and its relationship to other campus agencies, the place of psychology in a college health program, health education, relationship of athletics to the health service, sanitation, clinical preventive medicine, and the place of the student health service in the University program and its relationship to the administration. Moderator of the panel was Dr. Frank Robertson, University of Denver, and the eight panel members were: Dr. Ralph Canuteson, University of Kansas; Dr. Sigmund Gundle, psychiatrist, University of Kansas; Dr. William A. Hunt, Northwestern University; Dr. Lewis Barbato, University of Denver; Dr. B. W. Lafene, Kansas State College; Mr. R. W. Hart, regional sanitary engineer, USPHS, Kansas City; Dr. Lawrence Holden, University of Colorado, and Dr. R. G. Gustavson, chancellor of the University of Nebraska.

At the business meeting the officers elected for the South Central Section for 1952-1953 are: President: R. W. Wilson, M.D., University of Nebraska, Lincoln; vice-president: R. I. Canuteson, M.D., University of Kansas, Lawrence; secretary-treasurer: Mrs. Alta V. Bergquist, R.N., Nebraska State Teachers College, Kearney; board members: Mrs. Ruth Matthews, Nebraska State Teachers College, Peru, George Trimble, M.D., Washington University, St. Louis, Missouri.



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OBTURATOR INTERNUS SPASM AS A CAUSE OF PELVIC AND SCIATIC DISTRESS

(Continued from page 287)

tating. One woman had a urinary infection, one had recently undergone pelvic surgery, one had some fissures in ano which would bring it into the category of cases described by proctologists. One woman had various complaints which were attributed to hysteria but in this particular case I was nonplused as to how I could blame a finding such as tenderness and spasm of the obturator internus to the patient's hysteria.

In summary, attention has been called to the obturator internus muscle as another potential cause of pelvic and sciatic distress. Seven cases have been recorded in which the one common feature is tenderness over the origin and belly of the obturator internus muscle on digital pressure.

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EDUCATION FOR CHILDBIRTH IN PRIVATE PRACTICE

(Continued from page 278)

We also do not especially favor the term "natural childbirth" and its implications, but we do approve of the satisfactory results we are obtaining, no matter what term may be used to describe the method.

Like others, we feel that having a baby is a muscular effort.[5] In fact, the second stage is a strenuous muscular effort. However, for years doctors have delivered millions of babies with no muscular preparation in the mother, yet we would not expect an athlete to take part in a tournament without training in his particular field.

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International Meetings

Australasian Medical Congress, Melbourne, Victoria, Australia, Aug. 22-30. Dr. C. H. Dickson, Medical Society Hall, 426 Albert St., East Melbourne, Victoria, Australia, General Secretary.

European Congress of Cardiology, University of London, Bloomsbury, W.C.1, England, Sept. 10-12. Dr. K. Shirley Smith, 35 Wimpole St., London, W.1, England, Secretary.

European Society of Cardiovascular Surgery, Strasbourg, France, Oct. 3-4. Sir James Learmonth, Department of Surgery, University New Buildings, Edinburgh 8, Scotland.

Inter-American Cardiological Congress, Buenos Aires, Argentina, Aug. 31-Sept. 7. Dr. Blas Moia, Larrea 1132, Buenos Aires, Argentina, Secretary-General.

Inter-American Congress of Public Health, Havana, Cuba, Sept. 27-Oct. 1. Pan-American Sanitary Bureau, 2001 Connecticut Ave., Washington, D. C.

Inter-American Congress of Radiology, Mexico City, Mexico, Nov. 2-8. Dr. Guido Torres Martinez, Marsella No. 11, Mexico, D.F., Secretary-General.

International Congress of Dermatology and Syphilology, London, England, July 21-26. Dr. Gordon B. Mitchell-Heggs, 5, Lisle St., London, W.C.2, England, General Secretary.

International Congress of Dietetics, Royal Tropical Institute, Amsterdam, The Netherlands, July 7-11. Miss Diane J. Ten Haaf, Educational Bureau of the Nutritional Council, 42 Koninginnegracht, The Hague, Netherlands, General Secretary.

International Congress on Diseases of the Chest, Rio de Janeiro, Brazil, Aug. 24-30. Mr. Murray Kornfeld, 112 East Chestnut St., Chicago 11, Illinois, Executive Secretary.

International Congress of Haematology, Mar del Plata, Argentina, Sept. 21-26. Dr. Carlos Reussi, Anchorena 1710, Buenos Aires, Argentina, Secretary.

International Congress of the History of Medicine, Nice-Cannes, France, and Monaco, Sept. 8-18. Dr. F. A. Sondervorst, 124 Avenue des Allies, Louvain, Belgium, Secretary-General.

International Congress of Internal Medicine, Friends House, London, N.W.1, Eng., Sept. 15-18. Sir Harold Boldero, 12 Pall Mall East, London, S.W.1, England, Secretary.

International Congress of Neuropathology, Rome, Italy, Sept. 8-13. Dr. Armando Ferraro, 722 W. 168th St., New York, N.Y., U.S.A., Secretary-General.

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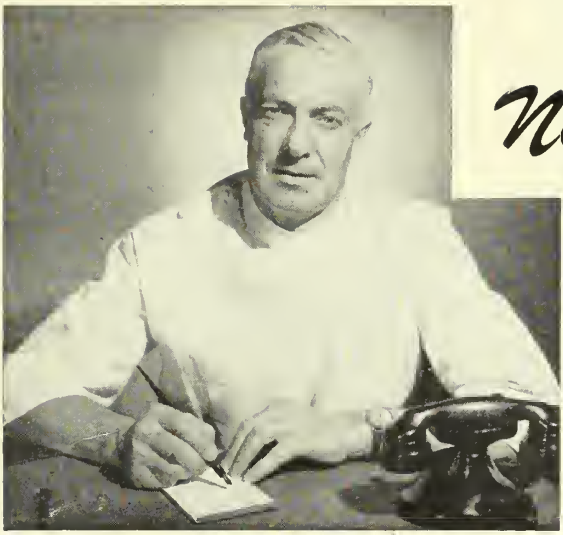

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SUPRAPUBIC VESICOURETHRAL SUSPENSION FOR STRESS INCONTINENCE

(Continued from page 282)

procedure has led to its excess use. In 1951, we performed 456 major and 315 minor operative procedures of which 20 were at least in part suprapubic urethrovesical suspension. This constitutes 13 per cent of the 154 major operative procedures done during the past year of which bladder reparative surgery was an integral part. It is our impression that in the future handling of patients with stress incontinence and other serious bladder dysfunctions, more than 13 per cent of our bladder repairs will be by the technique under discussion.

The advantages of the procedure would appear to be, remembering the short follow-up period, the anatomical and functional excellence of the results, the value of having at one's disposal a technique which can be applied for stress incontinence in patients having other abdominal pelvic procedures, and the smooth convalescence.

The disadvantages appear to be the necessity of a drained abdominal incision, the necessity of posterior colporrhaphies in many of these patients, the as yet undetermined quality of permanence, and the venous oozing encountered occasionally.

SUMMARY

1. The suprapubic urethrovesical suspension as described by Marshall, Marchetti, and Krantz has been employed for the correction of stress incontinence in 27 patients. Twenty of these patients have been observed for more than three months and comprise the basis of this study.

2. The procedure relieves stress incontinence. The single failure is described.

3. The excellent anatomical and functional results have been emphasized as observed for the short follow-up period which has elapsed since the procedure was instituted.

4. The use of Pfannenstiel incision, the use of the operator's own hand in the vagina, and the use of different needles for the soft tissue and periosteum are changes in technique which seem to be of value.

5. The procedure merits further trial.

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CLINICAL EVALUATION OF A NEW ANTIASTHMATIC COMBINATION

(Continued from page 304)

fect of the theophylline, ephedrine and phenobarbital combination continued for three to four hours.

With those patients in whom relief was not observed until the tablet was swallowed, it was difficult to determine whether the outer coating of N-isopropylarterenol or the inner combination of theophylline, ephedrine and phenobarbital was the effective agent. However, many of these patients felt that relief was faster than when the latter combination alone was administered.

Mild side effects of short duration, consisting of palpitation, nervousness, tremor, excessive perspiration, weakness, nausea or gastrointestinal distress, were experienced by 16 patients, or 26 per cent. However, it was necessary to discontinue medication in only three cases.

SUMMARY

(1) A new anti-asthmatic combination was found to be clinically effective in the symptomatic treatment of bronchial asthma.

(2) Its action afforded rapid and sustained relief.

(3) Of a group of 62 patients with bronchial asthma, 51, or 82 per cent, experienced some measure of relief.

(4) 41 patients, or 66 per cent, had good to excellent relief.

(5) The preparation was found most effective in the relief of bronchial asthma of a milder degree.

(6) Side effects which occurred in 16 patients, or 26 per cent, were mild and of short duration.

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MEET OUR CONTRIBUTORS

(Continued from page 299)

head of the department of obstetrics and gynecology at the University Hospitals in Iowa City.

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Stella Hazen Sikkema, a graduate of the University of Minnesota medical school in 1941, is staff physician at Students' Health Service and the hospitals of the University of Minnesota.

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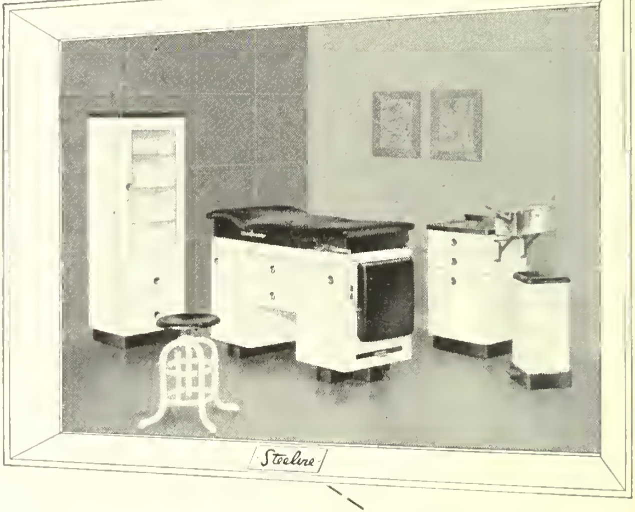

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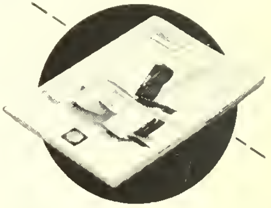

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A Drainage Method for Duodenal or Pancreatic Fistulae*

OSCAR F. NOEL, M.D., RAYMOND S. MARTIN, Jr., M.D.
and LEWIS C. POWELL, M.D.
Nashville, Tennessee

Postoperative duodenal or pancreatic fistulae create two serious problems. First, the patient may develop a severe electrolyte imbalance because of massive daily loss of fluids. And second, the skin of the abdominal wall may become markedly eroded by the digestive action of enzymatic secretions.

Electrolyte balance can be established and maintained by carefully planned parenteral and oral alimentation. The direct treatment of the fistula is often a more difficult problem. The multiplicity of methods employed to meet the latter problem indicate that no one method of treatment has been entirely satisfactory.[1,2,3] Dressings absorb duodenal secretions and increase destruction of the skin. Several authors have advocated irrigation of duodenal fistulae with weak acid solutions, because maximum digestion of tissue by activated trypsin occurs between a *p*H of 7 to 8.[4] Aluminum-zinc oxide ointment and acid buffer gels have been used to protect the skin.[3] These methods have proved useful only as an adjunct to the more effective measure of mechanical removal of the fluids by continuous suction.[5]

Cameron,[6] in 1923, first recommended continuous suction in the treatment of duodenal fistulae. Chaffin,[7] in 1940, described an effective "vented" suction drainage which he employed in the treatment of peritonitis and its complications. This principle of continuous air flow through a pair of indwelling tubes in duodenal fistulae has been found to be an excellent method of drainage.

A simple apparatus can be easily constructed. Two small rubber tubes of the same size are beveled at the ends so as to have an angle of less than 45 degrees at the tips. No. 12 F. catheters are suggested for duodenal and pancreatic secretions not containing solid material. Smaller or larger tubes may be indicated, depending upon the size of the fistula and the viscosity of the draining fluid. A hole is made through the wall of the tubes just above the proximal angle of the bevel and on the opposite sides. The diameter of the hole should be the same as that of the lumen of the tube. The tubes are then sutured together with the side holes in juxtaposition, forming an air break from one to the other. Fine nonabsorbable sutures, at the tips, above and below the air break, and at 5 cm. intervals are sufficient to bind the tubes together. Sutures should not pass into the lumens because they will act as barriers on which material can collect to obstruct the outflow of fluid or air.

Air passes into one tube, through the air break and out the tube to which suction is applied (figure 1). The constant flow of air through

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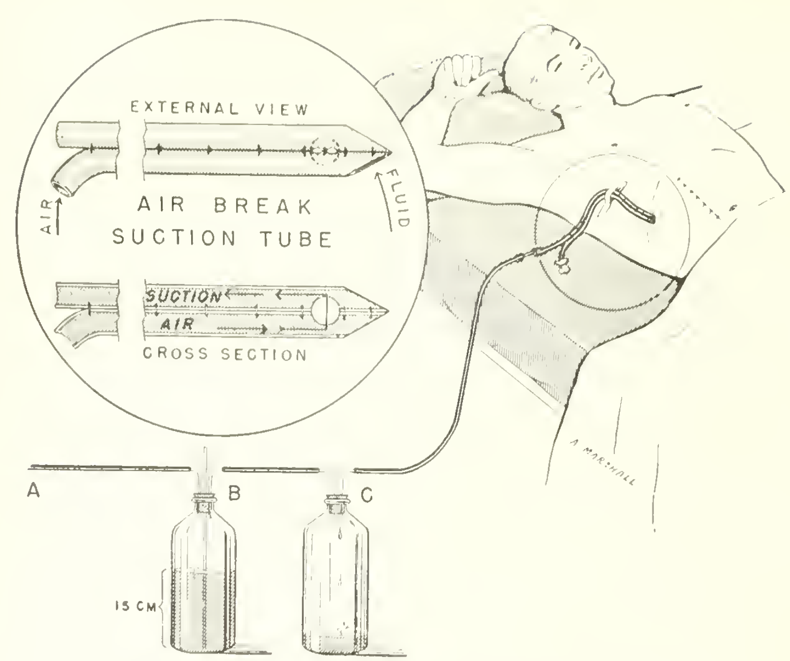

Fig. 1. Diagram showing details of drainage apparatus and apparatus in use.

the air break prevents occlusion of the tubes by surrounding soft tissue. Suction is obtained by either a Stedman pump or a water-tap siphon. An open water manometer is included in the system to regulate constantly the amount of suction in the fistula. A fluid trap for collection and measurement of secretions is placed between the water manometer and the drainage tubes.

The tubes are inserted as close as possible to the internal opening of the fistula. When the digestive fluids are removed from the depths of the sinus, further destruction of the walls of the sinus tract and skin is prevented. No dressing is used about the fistula opening, and protective ointments on the surrounding skin usually are unnecessary. A gauze filter is used at the end of the intake tube.

The following cases illustrate this method of drainage.

CASE REPORTS

Case 1. T. B., white male, age 57, had a Billroth No. 2 gastric resection for intractable pain due to duodenal ulcer. The duodenal stump was not considered adequately closed because of the location and size of the ulcer. In anticipation of a duodenal fistula, a drain was placed near the duodenal stump and brought out through a stab wound in the right hypochondrium. On the third postoperative day, duodenal fluid was noted on the bandage. Aluminum paste and a single tube suction did not prevent severe erosion of the skin. The air break suction tube which has been described was first employed on this patient. The erosion of the skin rapidly improved and the sinus tract closed in 14 days.

Case 2. J. R., white male, age 62, had a perforation of the gallbladder with the formation of a local abscess and a cholecystoduodenal fistula. A cholecystectomy was performed and the duodenum was closed. On the eighth postoperative day, duodenal fluid drained from the operative wound. The duodenocutaneous fistula was confirmed by the prompt appearance of orally administered dye in the drainage fluid. A dual-tube air break suction was instituted. The daily fluid loss from the fistula varied from 200 to 300 cc. with an amylase activity between 15,000 and 27,000 Somogyi units. There was no erosion of the skin and the sinus tract closed in 14 days.

Case 3. J. W. H., white male, age 60, developed sudden severe abdominal pain nine days following a Hofmeister gastric resection for duodenal ulcer. On reoperation a large amount of pancreatic fluid of high amylase activity was found in the abdominal cavity. There was no leakage at the site of the anastomosis. A Penrose drain was placed near the pancreas and brought out through a stab wound in the right hypochondrium. The skin became severely eroded after seven days. Amylase activity of the drainage fluid varied between 40,000 and 45,000 Somogyi units. Injection of the sinus tract with 35 per cent Diodrast outlined the main pancreatic duct, the entire biliary tree and the duodenum. The dual-tube air break suction system was employed and the skin healed rapidly. Drainage continued for eight weeks, 500 to 1400 cc. daily. This amount decreased gradually and the fistula closed as the tubes were slowly withdrawn.

Summary

Electrolyte disturbance and skin erosion are serious complications of postoperative duodenal or pancreatic fistulae. Mechanical removal of drainage fluid by continuous suction has proved the most effective measure in combatting this problem. A simple dual-tube air break suction apparatus is described. Case reports are presented in which this method of suction has been applied.

(Continued on page 350)

History of Blood Transfusion*

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Minneapolis, Minnesota

From the dawn of human history blood has been regarded as a most vital humor of the body. Since hemorrhage in illness, wounds and injuries, was commonly observed to lead to death, blood became invested with many mysterious properties among which were the vitality and vigor of its host. Among primitive peoples it was common practice to drink the blood of vanquished animals and enemies, and among the Romans the blood of bulls slain by gladiators became a popular beverage. Bathing in blood was also recommended as a cure for weakness and illness. In Ovid's *Metamorphosis* is told how the witch, Medea, rejuvenated Jason's aged father, Aeson, by slitting his throat to let out his ancient blood, replacing it with a concoction of herbs and offal of birds and animals, so that both body and mind returned to their state of forty years before. This fable, it is claimed, later inspired Sir Christopher Wren's suggestion of using blood transfusions therapeutically.

In medieval literature the oral injestion of blood has been at times confused with transfusion. The oft quoted and controversial famous "transfusion" of Pope Innocent VIII in 1492 was probably given as a draught. Most historians do not believe intravenous transfusions were then possible, at least in a modern sense, prior to the discovery of the circulation by Harvey in 1616. However, according to Villari,

> ". . . the Pope had had an apoplectic stroke the year before and had for some time fallen into a kind of somnolency which was sometimes so profound that the whole court believed him to be dead. All means to awaken the exhausted vitality had been resorted to in vain when a Jewish doctor proposed to do so by transfusion, by a new instrument, of the blood of a young person, an experiment which hitherto had only been made on animals. Accordingly the blood of the decrepit old Pontiff was passed into the veins of a youth whose blood was transferred into the veins of the old man. The experiment was tried three times, and at the cost of the lives of the three boys (who were each to receive a ducat as a reward) probably from getting air into their veins, but without effect to save the life of the Pope."

The veracity of this story has been subject to considerable controversy, and both Mathews and Sir Geoffery Keynes believe the blood was administered as a draught. There is agreement, however, on the circumstance that the experiment was unsuccessful, that the Pope and three boys died, and that the physician promptly fled the country.

Magnus Pegelius of Rostock in 1604 and Andreas Libavius in 1615 wrote of the idea of transfusion but did not seriously contemplate putting their ideas into practice. However, the following description appears in the writings of Libavius in 1615:

> "Let there be a young man, robust, full of spirituous blood and also an old man, thin, emaciated, his strength exhausted, hardly able to retain his own soul. Let the performer of the operation have two silver tubes fitting into each other. Let him open the artery of the young man and put into it one of the tubes, fastening it in. Let him immediately after open the artery of the old man and put the female tube into it, and then the two tubes being joined together, the hot and spirituous blood of the young man will pour into the old one as if it were from a fountain of life and all of his weakness will be dispelled."

Whereas some believe Libavius was a serious advocate of transfusion, others think that he considered the procedure as ridiculous and contemptible, and the extravagance of his claims was merely an expression of irony. Ore points out that on being questioned as to what should be done to prevent the donor of blood from becoming weak, he replied that there is more need of protecting the physician who proposes the operation and that while the former should have some good broth, the latter should be given hellebore. Three hundred years later, Bernheim (1912) quite independently designed and successfully used transfusion tubes which bear a remarkable resemblance to those proposed by Libavius.

Similarly, Johannes Colle of Padua in 1628, who may have known of Harvey's work, in writing of methods of prolonging life, mentioned blood transfusion as a possible means of carrying this out, but there is no evidence that he ever made the attempt. Harvey himself pumped water into the circulation of a dead man, but did not consider blood transfusion as a therapeutic measure. During the next twenty-five years the concept of the circulation was gaining recognition, and the idea of transfusion may have occurred to a number of physicians independently. Workers in England, France, Germany and Italy were active in this field, and from their reports it is difficult to establish a clear priority. However, the first documented and successful experiment appears to be that of Richard Lower, who in February 1665 performed the first successful transfusion from dog to dog in a demonstration at Oxford. The experiment was witnessed by members of the faculty of Oxford, communicated to the Honorable Robert Boyle and by him imparted to the Royal Society. It appeared in the Philosophical Transactions on Monday, December 17, 1666.

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*From the department of surgery, University of Minnesota, presented at surgical history seminar.

†Associate professor of surgery, University of Minnesota, Minneapolis, Minnesota.

Editor's note: See editorial by Dr. R. W. Koucky, page 342 of this issue.

These investigations were the outcome of earlier experiments by Sir Christopher Wren at Oxford (1656-57), where, for the first time, intravenous administration of medicinals was successfully carried out. Among the materials injected were opium, scammony and wine, and in these experiments various animals were purged, vomited, killed or retrieved. Lower was present at these initial studies, probably participated in them, and later joined in the discussions of them. The experiments are documented in the Philosophical Transactions of December 4, 1665 to quell the controversy regarding their priority.

Wren apparently was not present at the epochal experiments of Lower's at Oxford in February 1665, for he spent the early part of this year in Paris where he was concerned with the plans for the building of the Louvre.

Richard Lower in his celebrated "Tractus de Corde" (1669) devotes in it a chapter on blood transfusion in which he clearly sets forth his experiments and claims to priority, in an interchange of letters between himself and Robert Boyle.

London, June 26, 1666

I was present last Wednesday (Honorable Sir) at the stated meeting of the Royal Society, held in Gresham's College. Here I heard from Dr. Wallis that you had at last (in his presence) successfully accomplished that most difficult experiment on the transference of blood from one to the other of a pair of dogs. I judged the matter clearly worthy of being communicated to that very celebrated assembly. I therefore proposed that they should ask that distinguished gentleman for an account of the way in which it had been performed. His description of it was such as to increase not a little our opinion of your reputation. But, when asked for various details about so unusual and so unhoped-for an experiment, he voiced the opinion that it would be more profitable for you to reply in writing about the individual points than for him to attempt it orally. I therefore stated publicly that you had promised me, a little while before, that you would describe the matter to me (if at any time your desires were answered). I took it upon myself to say that you would do this, and that the more fully, when you knew that this celebrated assembly wished for a more careful account of the success of this experiment. I therefore entreat you to accede to this request, and to relate in order the whole of the highly successful procedure you adopted for the accomplishment of this task. This I urge the more strongly, because some highly gifted men with fair powers of judgment, and not overcredulous, thought the experiment a difficult one, and considered that I had spoken rashly, when I mentioned it incidentally a few months ago, in reply to a question from the Royal Society as to what you had previously attempted at Oxford; and said that, although at that time the matter had not succeeded in every way as you wished, owing to some unsuitability of the instrumental equipment, I had not, however, given up hope of your ultimate success. I am being called away at the moment, so that I have not time to ask your pardon for putting you to this trouble. I have done so with less reluctance, because I thought it would be to your advantage, if this celebrated assembly became acquainted with you at this propitious moment. There are many among its members who esteem you at your right worth and are your friends, but none more so than

Yours affectionately,

Rob. Boyle

To be delivered to
My most honorable friend
Richard Lower, Doctor of Medicine: Oxford.

* * *

Oxford, July 6, 1666

I have received your letter, Honored Sir, and, in accordance with your request, I will briefly expound to you the whole technique of transfusion in the same order as that in which I performed it. In a dog, then, or any other animal, whose blood you wish to transfuse into another animal of the same or of a different species, first lift up one cervical artery, free it from the nerve of the eighth pair, and clean its surface for about the distance of one finger. Then ligature the upper, brainwards, portion firmly and tightly with a cord, as there is no need to loosen it again or to unfasten it during the whole course of the operation. Next, lower down towards the heart, apply a second ligature to the same vessel at half a finger's distance from the aforesaid cord, using a slipknot so that, as need arises, you can at will tighten or slacken the cord. When you have so placed your two ligatures in position, and have passed two strings under the artery in the intervening space, open the vessel with a scalpel and insert a quill into the incision in the direction of the heart. The external opening of the quill must be closed with a wooden rod. In addition pass the aforementioned strings closely round the portion of artery enclosing the quill and tie them tightly.

In the second animal, which is to receive the blood of the first, clean a small portion of the surface of the jugular vein about half a finger long, and apply a ligature at each end, knotting the cord in each case in such a way that you can loosen it or tighten it at will. Two strings again should be passed under the vein in the intervening space, and, when the incision is made, two quills are to be inserted into the opening. One of these is directed towards the trunk of the descending vena cava, and is to receive blood flowing in from the other dog; the second is pushed upwards towards the brain and is to discharge this animal's own blood into suitable vessels. Both quills must be closed meanwhile with wooden bungs and only opened as required. Finally, the vein must be ligatured with the strings, as described above.

When you have done this you lay the dogs on their side and fasten them closely together as best you may to ensure the connexion of the two quills. But, as they cannot approach thus near owing to the twist of the animals' necks, some intermediate quills are necessary in addition to the two end ones, in order to join these latter together and to effect the transference of blood.

On the completion of these preliminary arrangements, open the two quills for the first time, that is to say, in the one dog the quill passing down into its jugular vein, and in the other the quill coming from its cervical artery. Then insert in between as many extra quills as will be necessary and join them together; and now, if the knots, which we decided should be slip-knots, are loosened, the blood immediately passes quite rapidly through the quills, just as through an artery prolonged by anastomosis. Quickly tighten a noose around the neck of the receiving animal, as in venesection, or at all events compress the vein on the opposite side of the neck with your finger, then take out the stopper and open the upper jugular quill, so that, while the foreign blood is flowing in through the lower quill, the animal's own blood flows out from the upper into suitable receptacles (this, however, with intervals of rest interposed, out of regard for the animal's comfort and for the preservation of its strength) until at last the second animal, amid howls, faintings, and spasms, finally loses its life together with its vital fluid.

When the tragedy is over, take both quills out of the jugular vein of the surviving animal, tie tightly the former slip-knots, and divide the vein. This can be done with practically no inconvenience to the dog, inasmuch as there is a very abundant anastomosis of the jugulars round the larynx and one of them is, therefore, sufficient for the return of blood from the head. After the vessel has been divided, sew up the skin, slacken the cords binding the dog, and let it jump down from the table. It shakes itself a little, as though just aroused from sleep, and runs away lively and strong, more active and vigorous, perhaps, with the blood of its fellow than with its own.

One further instruction I must give you, distinguished Sir. It was impossible to tie the quills sufficiently tightly in the vessels, or to join them to one another securely enough, to prevent them from frequently getting slack and loose again. I therefore concluded that it would be better in future to use silver tubes made for this purpose. These should be provided at one end with a projecting ring, to prevent the possibility of their being torn out of the vessels into which they are inserted, and this ring is to be a double one to ensure safer tying of the vessels over the tubes. And so that the experiment can be conducted with less difficulty in transfusion, or danger of obstruction within the vessel, especially when the animals toss and twist about, they should be united by two smaller tubes which you must insert into a cervical artery taken from a horse or an ox, the complete series so joined carrying blood from the donor on one side to the recipient on the other. We have this further advantage from the substitution of an artery in between, that it yields to the struggles of the animals however varied they are, and also that you will be able, if by any chance the blood inside it clots, to push it onwards, should you so wish, or to stop its flow at once, if occasion arises. I have written this to fulfill the pledge given by you on my behalf to the most illustrious Society, and, further, that you may know that you will never find me wanting in any good-will or duty towards you.

Yours most respectfully,

RICHARD LOWER

To be delivered to
The Honorable Dr. Robert Boyle, in London.

To further clarify his position in the controversy with Jean Denis of Montpellier over priority of establishing blood transfusion, Lower goes on:

"Transfusion was therefore first performed by me at the end of February 1665, the honorable Boyle's letter was given to me on the 6th of the following June and my reply inserted next December in the Philosophical Transactions. Denis on the other hand makes no mention of transfusion until a whole year later and further, he himself admits (although he says he thought of it 10 years before) that he learned first from philosophical books, the possibility of transfusion and the technique for its achievement. I therefore leave it to others to judge who should receive the credit for the discovery of this experiment."

Although the early history of transfusion seems to be concerned for a large part with rejuvenation, the restoration of lost vitality in the debilitated, and the treatment of insanity and senility, Lower points out in his book that transfusion may find a real field of usefulness in hemorrhage and trauma, a fact which was to be rediscovered 150 years later by Blundell.

Samuel Pepys was present at some of the discussion of this attractive experiment, and in his diary on November 14, 1666 he reports:

"Here (at the Popes Head) Dr. Croone told me that at the meeting at Gresham College tonight there was a pretty experiment of the blood of one dog let out till he died, into the body of another on one side while all his own run out on the other side. The first died upon the place and the other very well and likely to do well. This did give occasion to many pretty wishes as of the blood of a Quaker to be let into an Archbishop, and such like; but as Dr. Croone says, may if it takes be of mighty use to man's health for the amending of bad blood by borrowing from a better body."

In the December 9, 1667 Philosophical Transaction appears the report of the first human transfusion performed by Richard Lower and Edward King upon one Mr. Arthur Coga, a somewhat demented individual, on November 23, 1667.

"Having prepared the carotid artery in a young sheep we inserted a silver pipe into the quills to let the blood run through it into a porringer, and in the space of almost a minute, about 12 ounces of sheep's blood ran through the pipe into the porringer, which was somewhat to direct us in the quantity of blood now to be transfused into the man. Which done when we came to prepare the vein in the man's arm, the vein seemed too small for the pipe which we intended to insert into it; so that we employed another, about one-third part less at the little end. Then we made an incision in the vein after the method previously published, which method we observed without alteration. And having opened the vein in the man's arm with as much ease as in the common way of venesection, we let thence run out 6 or 7 ounces of blood. Then we planted our silver pipe into the said incision and inserted quills between the two pipes already advanced in the two subjects, to convey the arterial blood from the sheep into the vein of the man. But this blood was near a minute, before it had passed through the pipes and quills into the arm; and then it ran freely into the man's vein for a space of two minutes at least; so that we could feel a pulse in said vein just by the end of the silver pipe. And as to the quantity of blood received into the man's vein, we judge it was about 9 or 10 ounces: For, allowing this pipe one-third less than that through which 12 ounces passed in one minute before, we may very well suppose it might, in two minutes, convey as much blood into the vein as the other did in the porringer in one minute, granting withall, that the blood did not run so vigorously the second minute as it did the first, nor the third as the second, etc. But that the blood did run all the time of the two minutes we conclude from thence, first because we felt a pulse during that time. Secondly upon the man's saying he thought he had enough, we drew the pipe out of his vein, the sheep's blood ran through it with a full stream which it had not done if there had been any stop before in the space of those two minutes; the blood being so very apt to coagulate in the pipes upon the least stop, especially the pipes being so long as three quills.

"The man after this operation, as well as in it, found himself very well and hath given in his own narrative, under his own hand, enlarging more on the benefit he thinks he hath received by it, than we think fit to own as yet. He urged us to have the experiment repeated upon him within three or four days after this but we thought it advisable to put it off somewhat longer. And at the next time, we hope to be more exact, especially in weighing the emittant animal before and after the operation, to have a more just account of the quantity of blood it shall have lost."

However, the experiment was not repeated, for two years later in his book Lower states "that on urging the patient later to repeat the treatment in an effort to improve his mental condition, he, on the other hand, consulted his instinct, rather than the interest of his health, and completely eluded our expectations."

To Richard Lower also goes credit for being the first to describe oxygenation of blood in the lungs. He observed that blood in the pulmonary veins remained florid if the animal was kept alive by artificial respiration, and when the artificial respiration was stopped, when no air was driven into the lungs, the pulmonary venous blood and that in the left heart became dark and cyanotic. On the basis of his experiments he concluded that the change in color of the blood in passing through the lungs was due to air actually being taken into the blood. He stated that fresh air is as essential to efficient breathing as it is to a flame, "in fact, where a fire burns readily, there can we easily breathe."

Meanwhile similar studies in transfusion were being conducted in Paris by Jean Baptiste Denis, professor of mathematics and philosophy at Montpellier, and physician to Louis XIV, whose first human transfusion antedated by five months that of Lower. In June 1667 he performed the first authentically recorded successful transfusion on a human. The patient was a youth of fifteen, who had some obscure fever which had been treated by repeated venesections until he was in a state of exhaustion. Following the successful administration of nine ounces of blood from the carotid artery of a lamb, the boy made an astonishing recovery. Two additional cases were successfully transfused. His fourth case, a lunatic who had been transfused on two occasions previously, died of a reaction. After the second transfusion "his arm became hot, the pulse rose, he complained of pain in the kidneys and was sick at the stomach." The next day the urine was very dark. After the fatal third transfusion Denis' enemies conspired with the widow to bring Denis to trial for murder, but following a protracted trial he was acquitted. However, it was directed that in the future no transfusion was to be given without the consent of the Faculté de Médicin of Paris, and since the leaders of the Faculté were the leaders of the opposition to Denis, such consent was never forthcoming. Ten years later human transfusions were specifically prohibited by law, thus closing this chapter of transfusion in France. Similar censure occurred in Rome and England, and for the most part further advances in transfusion were to wait a hundred and fifty years to be reintroduced by Blundell in 1818, when the first human to human transfusion was performed.

Although the idea of transfusion as conceived and carried out by Lower and Denis was a brilliant advance for their age and fired the imagination of their colleagues, the state of science and biology of that time was too immature to allow it to proceed to its full fruition. In the light of present knowledge it is well that legal and ecclesiastical hurdles were placed in its way, as many needless deaths were thereby avoided until a fuller appreciation of biologic reactions involved in transfusion of blood was developed. Nevertheless, the experiment of blood transfusion in man had gained great notoriety, and a number of authors of textbooks included an account of the procedure in their works.

The second phase of the development of blood transfusion stemmed from the impetus given the problem by James Blundell (1790-1877), a distinguished London physiologist and obstetrician who reported the first successful transfusion of human blood to human recipient on December 22, 1818, before the Medico Chirurgical Society in London. The patient was moribund from inanition probably due to cancer of the stomach and received 12 to 14 ounces of blood by syringe in the course of forty minutes. Although temporarily improved, he soon relapsed and expired fifty-six hours after the transfusion. Blundell was a man of inquiring mind and sound scientific background, and as an obstetrician he had time and again observed patients die from blood loss. His concern with transfusion was directed principally towards correction of such an emergency rather than the evanescent rejuvenation and cure of senility that occupied the minds of many of his predecessors. He established experimentally that death from hemorrhage in animals could be prevented by transfusion of blood of the same species, and found that blood of another species proved to be unsatisfactory, since the temporary resuscitation it effected was followed by death after several days. For human transfusion he insisted that only human blood was suitable. Blundell compared the effects of donor arterial blood to donor venous blood and found them equally suitable. Also, he noted no ill effects by passing the blood through a syringe. He injected two drams of air intravenously in dogs with no untoward results, thereby refuting the old claim that a few bubbles of air injected intravenously was lethal. In addition, he observed that it was unnecessary to restore blood loss volume for volume, and felt that a transfusion somewhat less than the amount lost was more beneficial. Blundell performed the operation of transfusion ten times, for the most part on exsanguinated women. Two of his patients were probably dead at the time of transfusion. Four of his attempts were successful with salvage of extremely ill patients.

From the time of reintroduction of blood transfusion by Blundell and for the remainder of the nineteenth century, the operation gained a certain recognition as a therapeutic weapon to be used as a last resort. However, most reports during this time were concerned with the technical aspects of accomplishing this operation. The ready coagulation of blood was a constant obstacle to its wide adoption, and many ingenious devices were advocated to overcome this ever-present hazard. Among these were the impellor, a syringe combined with a two-way valve mechanism, and the gravitator of Blundell, Waller's syringe (1859) and Aveling's tubes (1873). In addition to the technical difficulties of effecting transfusion, the untoward reactions to the recipient continued to occur. Donors were difficult to obtain and usually were frantically sought for as a premortem event. Toward the end of the nineteenth century further biologic discoveries provided the necessary information to make this procedure safe and effective and laid the foundation for the modern era of transfusion.

Creite (1869) described the clumping of human red blood corpuscles when placed in the sera of cats, dogs, and sheep. Lanlois (1875) elaborated on these studies and showed that the serum of one animal may have the property of destroying the red blood cells of another, and explained on this basis the hemoglobinuria following heterologous transfusion. In 1900-1901 Landsteiner made the fundamental observations for which he was later awarded a Nobel prize, that when the serum and cells of different normal individuals were mixed, agglutination of the erythrocytes frequently took place. On the basis of his studies he was able to describe three groups of normal individuals whose blood could be separately classified on the basis of their agglutinating reactions. A fourth group was added in 1902 by von Decastello and Sturli. Jansky in 1907 worked out the reciprocal agglutination reactions of the four groups and proposed the numerical groupings 1, 2, 3, and 4. In 1910 Moss working independently in this country arrived at similar conclusions and proposed another numerical classification in which groups 1 and 4 were the reverse of Jansky's. Because Moss' publication was more readily available his classification achieved wide usage, although the Jansky classification, because it enjoyed a historical priority, was also utilized simultaneously. Because of this confusing and dangerous situation, a special committee of the American Medical Association reviewed the problem in 1921 and recommended that, in view of its priority of three years, preference should be given to the Jansky grouping. Nevertheless, the Moss grouping continued in wide usage, and more recently the Health Committee of the League of Nations recommended the universal adoption of the International Nomenclature Groupings of AB, A, B, and O, based on the original work of Landsteiner and the presence of the agglutinogens in the red blood cells. Today for the most part

CLASSIFICATION OF BLOOD GROUPS

Groups International Nomenclature	Agglutinogens in RBC	Agglutinins in Serum	Jansky Numbers	Moss Numbers
AB	A & B	None	4	1
A	A	Beta	2	2
B	B	Alpha	3	3
O	None	Alpha & Beta	1	4

the confusing numerical groupings have been dropped, and the alphabetic classification is in universal usage. In 1939 this hospital dropped the Moss terminology and adopted the international nomenclature.

Although the work of Landsteiner and others in defining human blood groups at last provided the means for making transfusion a safe procedure, it is interesting to observe the long time lag before cross-matching of blood became a clinical procedure. Crile, who more than anyone else stimulated the profession in this country to utilize blood transfusion, in his book published in 1909 quotes the work of Landsteiner and von Decastello and mentions Hektoen, who first pointed out that homologous transfusion in man may prove dangerous because of erythrocyte agglutination within the vessels of the recipient. However, he goes on to state that experience has shown that the occurrence of hemolysis in vitro before transfusion does not necessarily indicate that it will occur in the vascular system of the recipient after transfusion. That this idea was commonly held is pointed out in the publication of McClure in 1917 where he states, "eight or nine years ago great discredit was thrown upon laboratory tests by most men doing transfusions. It was the common saying that hemolysis or agglutination might occur in vitro but not in vivo and vice versa. At first I agreed with this attitude and while in New York good fortune was at my side and I had no serious accidents. Later, however, I became convinced of the great importance of these tests and shall never again consent to do a transfusion except under the most extreme urgency without the proper report from these laboratory tests."

Now, with transfusion placed on a sound rational basis, with proper tests to assure its safety, the further adoption of the procedure had to await the development of practical techniques to circumvent the problem of coagulation. Many ingenious techniques were advanced but all were difficult, time consuming and not without danger. Alexis Carrel perfected his technique of direct vessel anastomosis which was applicable to transfusion. Crile advocated a special metal tube over which an intimal to intimal anastomosis of donor artery to recipient vein could be effected, Bernheim, advocated his tubes for direct transfusion, and Lindeman proposed a multiple syringe method which, with numerous modifications, was widely adopted. However, it was not until the development of safe methods to render blood uncoagulable that it was possible for the benefits of transfusion to become widely available. The transfusion of defibrinated blood was largely abandoned following the demonstration that blood so treated contained an excess of fibrinolytic enzymes which exerted a hemolytic effect on the cells of the recipient. Huridin also was used as an anticoagulant but proved to be toxic and dangerous. In 1914 Hustin of Belgium reported on the use of sodium citrate as an anticoagulant, and the following year Richard Lewisohn of this country and Agote of Buenos Aires independently reported on the use of the same agent. Lewisohn demonstrated that in the concentration necessary to prevent coagulation (0.2 per cent) citrate was entirely harmless; he standardized the procedure and was instrumental in gaining its wide adoption. Many objections were advanced against the use of citrate, and a rather bitter controversy was waged over the merits of direct versus indirect or citrated transfusion. However, the ease and ready availability that the citrate method allowed gained for it wide usage during World War I, standardized its methods, and hastened full and ready acceptance for the method in particular, and for transfusion in general.

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(Continued on page 348)

Subcutaneous Injuries of the Liver

Reports of Two Cases

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With the advent of antibiotics, the common use of whole blood and plasma transfusions, improved techniques in anesthesia and surgery, the introduction of hemostatic agents such as Oxycel and Gelfoam, the liver has received a great deal more attention by surgeons during the past decade.

The drainage of abscesses, amebic and pyogenic, has, of course, been practiced for years. Today, successful surgery for neoplasms of the liver is not uncommon. The four most common of these, according to Acuff,[1] are hemangiomas, adenomas, primary carcinomas, and metastatic neoplasms. Portacaval shunt for portal hypertension due to extrahepatic block of the portal circulation is now being done with good results. Blakemore[2] reports 111 cases with an operative mortality of 16.2 per cent. The types of shunts most commonly used are the post caval anastamosis in which the portal vein is anastomosed to the vena cava, and the splenorenal shunt in which the splenic vein after splenectomy is anastomosed to the left renal vein.

Warren[3] reports a case of cirrhosis of the liver with ascites successfully treated by the use of the peritoneal button, a device which has also been used by others with success, the purpose of the button being to permit the escape of ascitic fluid into the subcutaneous tissue where it may be absorbed into the circulation. Benign strictures of the intrahepatic bile ducts are also receiving more attention. Several procedures for management of this condition are given by Carter and Gillette.[4]

Injuries of the liver fall into two main types: first, the penetrating wounds and second, the subcutaneous injuries. In penetrating injuries the degree of underlying damage to the liver cannot be determined, so all penetrating wounds of the abdomen should be explored and hemorrhage controlled by the placing of deep mattress sutures and the use of Gelfoam or Oxycel gauze. In addition, these patients require transfusions of whole blood and other supportive measures.

In subcutaneous injuries the diagnosis and choice of treatment is much more difficult. The symptoms, except in severe injuries, tend to be vague. There is right sided abdominal pain in varying degrees with abdominal rigidity. Shock is usually present but this too may vary from slight to severe. The presence of bradycardia is also reported, but Skapinker[5] reports 22 cases of liver injury in which this symptom was not present. (Bradycardia was noted in the first case presented in this paper.) In addition to a careful history and physical examination the x-ray should be utilized. An x-ray film of the chest may show fractured ribs over the liver, indicating the possibility of laceration of the organ, or may show elevation of diaphragm due to suprahepatic hematoma formation. An x-ray film of the abdomen, taken in the upright position, is useful in determining the presence of air under the diaphragm. When present, it indicates rupture of a hollow viscus. Ballooning of the psoas shadow may suggest retroperitoneal hematoma. Catheterization of the bladder may reveal presence of kidney or bladder injuries.

Subcutaneous injuries are usually classified on a pathological basis, as injuries with laceration of Glisson's capsule, and injuries with rupture of the capsule and parenchymal damage.

Wright, Prigot and Hill[6] proposed a very practical clinical classification into four types: (1) Massive hemorrhage, causing immediate or almost immediate death. (2) Acute hemorrhage, producing shortly after injury a state of shock which becomes rapidly deeper. (3) Repeated small hemorrhages. The patient enters the hospital in good condition but shows signs of progressive hemorrhage, increasing anemia, a rising pulse rate, a fall in blood pressure and progressive weakness. He may present signs and symptoms which may disappear except for tenderness in the hepatic area and then may recur gradually or with dramatic suddenness. The occurrence of internal concealed hemorrhage may occur from one day to as much as a month later. (4) Spontaneous cure. The patient shows evidence of injury to the liver, with signs of internal hemorrhage, and the signs clear up.

Some authors advocate conservative treatment of all subcutaneous injuries of the liver; others believe that in all suspected subcutaneous injuries surgical exploration of the abdomen should be done. The decision as to the best procedure rests with the surgeon and the procedure used should be the one which best fits the case at hand.

Extra-hepatic collections of bile, blood or pus may frequently complicate liver injuries, and may occur whether these injuries are treated surgically or conservatively. Blood, bile or pus, according to Acuff, may collect in seven spaces in the area of the liver. These are outlined and illustrated by Thorek[7] as the right superior anterior subphrenic space, the right superior posterior subphrenic space, the left superior subphrenic space, the left anterior inferior subphrenic space, the left inferior posterior subphrenic space, and the extraperitoneal space or the bare area which is the space within the coronary ligament.

Drainage of the right superior posterior space and the right inferior space is best accomplished by a posterior retroperitoneal approach, described by Ochsner and Graves, which avoids entrance and soiling of the pleural and peritoneal cavities. An incision is made over the twelfth rib. The rib is resected and the erector spinae muscles are retracted medially. A transverse incision at right angles to the spine at the level of the transverse process of the first lumbar vertebra is then carried down to the renal fascia. The peritoneum is bluntly dissected from the diaphragm until the abscess or fluid collection is reached. The right superior anterior, the right inferior, the left anterior inferior, the left superior and extraperitoneal spaces can best be reached through an anterior approach. A subcostal incision is used carrying it down to the peritoneum. The peritoneum is then bluntly dissected from the under-surface of the diaphragm until the abscess is reached, opened into and drained.

CASE REPORTS

Two cases of subcutaneous injury of the liver are presented, one complicated by subphrenic collection of bile.

Case 1. A 42 year old farmer was struck in the abdomen by the crank of his tractor. There was immediate severe pain, not localized definitely, but which seemed to be over the entire right abdomen. It required about an hour for him to reach the hospital. On entry his pulse was 64, blood pressure 120/80, respirations 18, and temperature 98°. The patient was apprehensive and complained of severe right sided abdominal pain but had no definite symptoms of shock. Physical examination revealed nothing unusual except an abrasion 2 by 2 inches in the right upper abdominal wall. There was tenderness in the right upper quadrant and the right flank, but no rigidity. Peristalsis was active. Urinalysis was negative. Examination of the blood revealed a red blood cell count of 4,400,000, white blood cell count of 21,900, hemoglobin 13.8 grams, 89 per cent, and a differential count of stabs 10, segs 65, lymphocytes 22, monocytes 3, and 1 plus toxic granules. X-ray film of the chest was negative. Intravenous pyelogram and cystogram were normal. An x-ray film of the abdomen revealed no free air in the peritoneal cavity. Because of these negative findings the patient was thought to have suffered a contusion of the liver without marked hemorrhage. Conservative treatment was instituted, the patient receiving penicillin, streptomycin and morphine.

During the first five days the patient's course was rather stormy with severe right upper quadrant pain, requiring frequent hypodermic injections of morphine; vomiting, requiring intravenous glucose and saline; dyspnea and pleuritic type of pain in the right lower chest requiring oxygen. He also had hiccoughs which were controlled with CO_2 inhalations. In spite of the above symptoms his blood pressure remained normal, as did his temperature, except for an elevation to 99.8° on the day after hospital admission. The urinalysis remained normal, but there was still a white blood count of 18,000. Right upper quadrant abdominal tenderness was present, but no rigidity or evidence of peritonitis developed. An icterus index on the seventh day was 19 units. He made steady gradual improvement, was ambulatory and feeling quite well except for occasional attacks of severe right upper quadrant pain and dyspnea, requiring morphine and oxygen for relief. On the twentieth hospital day pain and dyspnea became more severe and persisted. The temperature, which had been normal, went up to 101.2°, and pulse to 120. An x-ray film of the chest revealed marked elevation of the right leaf of the diaphragm and it was thought that he had developed a subdiaphragmatic hematoma (figure 1).

A right subcostal incision was made through the skin, and transversalis fascia down to the peritoneum. By means of the finger the parietal peritoneum was dissected from the under surface of the diaphragm until a fluctuant area was reached. On incising the peritoneum at this site a large collection of bile, approximately 2,000 cc., was drained extraperitoneally. The cavity involved the entire anterior superior space. The surface of the liver appeared grossly normal, and the source of the bile could not be seen. It was surmised that the laceration was located too far posterior and superior to be seen. No purulent material or blood was found. A soft rubber Penrose drain was placed in the cavity and brought up through the wound which was sutured with chromic one on the fascia and an interrupted on-end mattress suture of nylon on the skin.

Postoperative treatment consisted of administration of morphine, penicillin, chloromycetin, blood transfusions, bile salts, and vitamin K. Drainage of bile was profuse, saturating a heavy dressing daily for ten days following surgery. Recovery was slow, the patient having a great deal of pain, distention and weakness. Temperature ranged from 104° to 99° during the first three postoperative days, returned to normal on the fourth day, and remained normal until the twelfth day, when it went up to 101.8°. An x-ray film of the chest revealed a pneumonic process in the right lower lobe with the diaphragm still somewhat elevated, although less than before surgery. He was again given high doses of peni-

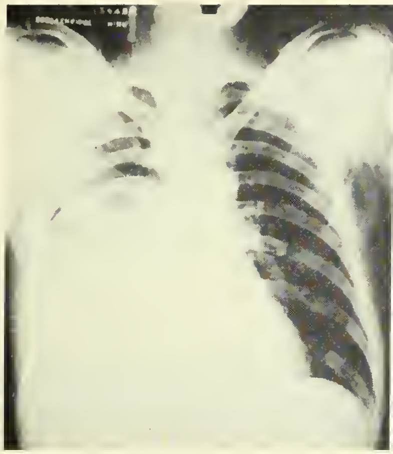

Fig. 1 (left). X-ray of the chest on the twentieth hospital day revealed a marked elevation of the right diaphragm and a compression atelectasis of the right lower lung. This film was taken just prior to surgery.

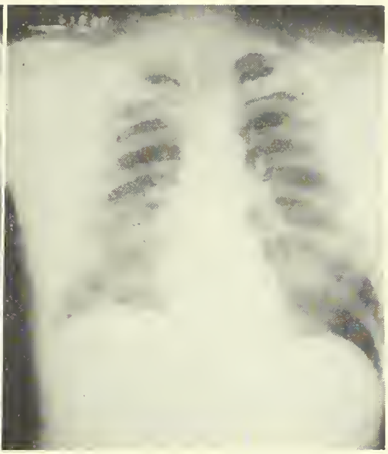

Fig. 2 (right). X-ray of the chest taken approximately five months after injury showing complete return of the right diaphragm to its normal position and reexpansion of the right lower lung.

cillin, and the temperature and pain subsided on the thirty-fourth postoperative day. He was discharged on the forty-sixth hospital day afebrile and asymptomatic except for weakness and small amount of bile drainage.

He was readmitted five days later because of chest pain. An x-ray film of the chest revealed small collection of fluid in right pleural space. His symptoms subsided promptly, and he returned home in three days.

The drain remained in place for one month after leaving the hospital. He continued to drain small amounts of bile for one more month by which time the fistulous tract had closed spontaneously. An x-ray chest film at this time showed complete clearing of the pneumonic process with the right leaf of the diaphragm back in its normal position (figure 2). He has regained his former weight and strength, is asymptomatic except for mild epigastric discomfort after meals, and has returned to normal activity.

Case 2. Robert W., a 12 year old boy, was stunting on the edge of a wagon box when he slipped and fell on the edge of the box, the force of the fall being centered across the upper abdomen. There was immediate pain in the abdomen and a feeling of weakness. He was brought in from the field in a car and was able to walk from the barn to the house.

The mother noticed that he was very pale, and he complained of severe abdominal pain. In a short time he tried to vomit and began to feel weak and perspire. About an hour and a half after the accident, he was brought in a car to the hospital where he was found to be in shock. On admission the pulse was 108 per minute and weak. The blood pressure was 80/46, and the patient was listless when not in paroxysms of pain which came every few minutes. He asked repeatedly for water. Physical examination revealed normal breath sounds, but an elevation of the right diaphragm. Heart sounds were normal but rapid, and there were no murmurs. The abdomen was not distended, but there was tenderness over the right upper quadrant, and moderate rigidity over the entire abdomen with some tenderness also in the lower abdomen. The vomitus was not bloody.

Administration of plasma was started immediately and in a half hour the blood pressure was 98/60. As soon as his blood could be typed and matched he was given a transfusion of 500 cc. of citrated blood. Three hours after the accident his blood pressure was 116/68. Throughout the night the pressure was maintained at a satisfactory level, and did not go below 108/60.

In the morning he was still pale, but felt much better. The abdomen was slightly distended and was most sensitive in the upper abdomen. He was still nauseated but was able to retain liquids. He was given another transfusion during the morning, since the blood examination earlier in the morning showed only 8 gm. (51 per cent) hemoglobin and 2,900,000 red blood cells per cu. mm. At 4:00 p.m. on the same day the blood count had gone up to 10 mg. (66 per cent) hemoglobin and 3,400,000 red blood cells per cu. mm. From then on the blood count steadily improved.

The day following the accident there was a trace of albumin in the urine and a four plus sugar with trace of acetone. Sugar was not found again in the urine.

An x-ray film of the chest taken on the fourth day following the accident showed essentially normal conditions.

Morphine sulphate, gr. ⅛, was given for sedation and pain as needed.

The boy gradually gained strength and asked for food after the first 20 hours. He was discharged on the tenth hospital day and is well and symptom-free to date.

COMMENT

The first case illustrates quite well the third type in the clinical classification given by Wright, Prigot and Hill.[6] The injury apparently caused repeated small hemorrhage or escape of bile, as was evidenced by frequent bouts of severe pain. Because of the profuse bile drainage following surgical drainage of the bile collection, it is surmised that the laceration had extended into one of the larger radicals of the biliary tree. One can only speculate as to whether early surgical exploration would have prevented the complication. Because no evidence of a laceration of the right superior anterior surface of the liver could be seen and the point of bile leakage could not be seen at the time of drainage, it is doubtful if this could have been visualized and sutured if early exploration had been done. It should be emphasized that even though early surgical exploration is carried out and the wound packed and sutured, it is not uncommon for collections of bile or blood to form afterwards and require drainage later.

(Continued on page 351)

Whole Defatted Pancreatic Substance in the Treatment of Psoriasis*

A Preliminary Report

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It is difficult to evaluate clinical results in psoriasis. In many cases the cutaneous lesions disappear without treatment. A seasonal change to warmer weather or a reduction in the fat content of the diet may cause temporary improvement. In two series totaling 90 cases of psoriasis, the results of oral treatment with whole defatted pancreatic substance were investigated and were sufficiently encouraging to justify further study. Accordingly, a larger series of cases with clinical controls will be studied before a final report is published.

In the present study, the sole treatment consisted in the administration of the pancreatic substance Lipan† in capsules orally. The product is derived from desiccated and defatted hog's pancreas. It contains enzymes, principally pancreatic amylase, trypsin, pancreatic lipase and carboxypeptidase (which splits off terminal amino-acids from proteins), as well as small amounts of lecithin, choline, iron, manganese and traces of vitamins and minerals. This product varies from the standard set up by the U. S. Pharmacopeia XIV in that Lipan has at least three times the standard amylolytic and tryptic activity. In other words, one part of this medication converts not less than 75 times its weight of starch into soluble carbohydrates and not less than 75 times its weight of casein into proteoses under the test conditions described in the U. S. Pharmacopeia XIV.

CLINICAL PROGRAM

Fifty clinic patients with psoriasis were selected upon their willingness to cooperate in this study. Their ages varied from 6 to 72 years. With few exceptions, all the cases were of long standing and had been treated by us or by others with the usual medications for many years and may be regarded as representing a fair cross section of clinic patients with psoriasis. There were 22 males and 28 females. Regardless of age, the patient was advised to take at least two 7.5 gr. capsules with each meal, thus averaging six to eight capsules daily as a minimum dosage. Ultraviolet light and other antipsoriatic measures were not employed, so that this line of treatment could be fairly evaluated. No dietary regime was recommended and only the use of alcohol, which we felt inactivated and interfered with the absorption of the medication was prohibited.

The cases were observed from six to twenty-four months. Ordinarily no profound alteration in the lesions occurred before two weeks of therapy.

ANALYSIS

There was complete regression of the cutaneous lesions in 5 cases or 10 per cent, decided improvement in 10 cases or 20 per cent, moderate improvement in 14 cases or 28 per cent, and no improvement in 21 cases or 42 per cent. These results must be interpreted in comparison with the natural uncertain course of the disease.

SECOND SERIES

A second series of 40 cases of psoriasis was observed in private practice. There was complete regression of the cutaneous lesions in 6 cases or 15 per cent, decided improvement in 14 cases or 35 per cent, moderate improvement in 11 cases or 27.5 per cent, and no improvement in 9 cases or 22.5 per cent.

COMMENT

Numerous references in the literature would indicate that psoriasis may be basically a disturbance of the fat metabolism. Also many workers have reported favorable results by the use of pancreatic extract.

While results were encouraging in the 90

(Continued on page 350)

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†The Lipan used in this study was supplied by Spirt & Co., Inc., Waterbury, Connecticut.

MEDICAL SCIENCES REVIEWS

In the interests of continuing medical education, The Journal-Lancet *offers this department of authoritative reviews of important progress in scientific medicine, both in the fundamental and the clinical fields. The editors propose to define medical sciences very broadly, and hope that each subject treated will be of sufficient importance to interest every reader.*

Experimental Atherosclerosis*

Part One

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Only one type of arteriosclerosis, i. e., *atherosclerosis,* is dealt with in this presentation. This subject delineation is not an arbitrary or artificial one. The term *arteriosclerosis* is a generic one. It refers to several distinct pathologic entities producing thickening of the vessel wall, e. g. atherosclerosis, Mönckeberg's sclerosis, arteriosclerosis, and hyperplastic arteriosclerosis. Recent research abundantly reinforces the conclusion that these are different entities.

The attention of investigators is correctly focused today on the problem of the etiology and pathogenesis of atherosclerosis, for among the arterioscleroses atherosclerosis is undoubtedly the most significant lesion. It is atherosclerosis that is the great human killer. It is the lipid-laden intimal plaque of atherosclerosis which impinges upon the lumen of large arteries, impairing the blood supply to heart, brain and/or kidney and bringing in its wake chronic illness and premature death. This pathologic process claims at least 200,000 victims annually in the United States, or one seventh of those dying from all causes.

In view of this situation, the recent recrudescence of atherosclerosis research is of the utmost significance. For all too long this field of research endeavor was in the doldrums, bogged down by the enervating "theory" that atherosclerosis is an inevitable process of aging. Today the defeatism and futility bred of this senescence "theory" have been swept aside. Overwhelming has been the evidence marshalled demonstrating that this "theory" is a patently erroneous dogma. Concomitantly a mass of data has accumulated—from both clinical and laboratory sources—in support of the *cholesterol concept of atherogenesis,* i. e., the concept that atherosclerosis is a disease process consequent upon an alteration in cholesterol and lipid lipoprotein metabolism. By attacking the problem of the detailed interrelations between altered lipid metabolism and atherogenesis, science can look forward to forging the preconditions of understanding for eliminating atherosclerosis as a disease. It is upon the basis of this cholesterol concept of atherogenesis that a fruitful research assault is proceeding apace in a number of laboratories.

EVIDENCE FROM MAN

The cholesterol concept of atherosclerosis rests upon an extensive foundation of clinical and experimental facts. Evidence from investigations on man have a four-fold source: (1) histopathologic; (2) biochemical pathologic; (3) ethnopathologic and (4) clinico-pathologic. A review of the extensive data from these sources is beyond the scope of this presentation. To summarize briefly the essential facts from these sources, histo- and chemico-pathology early revealed that extensive lipid and cholesterol deposition is a hallmark of the atherosclerotic lesions.

From the ethnopathologic viewpoint, comparative studies of morbidity and mortality due to atherosclerosis among different peoples indicate that significant differences exist among peoples (including Costa Ricans, Okinawans, Chinese, Japanese, Ceylonese, American and African Negroes, Kirghiz plainsmen, Eskimos and others) in incidence and severity of atherosclerosis.

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These differences appear to stem from culturally conditioned variations in nutrition and diet, rather than from racial, climatic or other influences. Specifically, a high correlation is frequently demonstrable between presence or absence of atherosclerosis and luxus or paucity of foods high in animal fat and cholesterol. Data accumulated in European countries during and after World Wars I and II lend further weight to the concept that there is a relationship between diet and atherogenesis. From these multiple studies the following tentative conservative conclusion appears justified: Atherosclerosis is generally more frequent and severe in well-nourished, particularly over-nourished peoples subsisting on diets rich in animal fat.

Finally, from the clinico-pathologic viewpoint, it is abundantly clear that in a number of disease states characterized by alterations in cholesterol metabolism and a prolonged hypercholesterolemic phase (among them hypothyroidism, the nephrotic syndrome, essential familial xanthomatosis, biliary obstruction, and diabetes mellitus) premature severe atherosclerosis is inordinately frequent.

This association between hypercholesterolemia and atherogenesis is commonly recognized by almost all investigators today. However, the salient fact remains that many people with clinically significant atherosclerosis are apparently free of associated disease and of gross hypercholesterolemia. Of prime importance, therefore, in evaluating the cholesterol concept of atherogenesis, is the answer to the question: Do such patients exhibit a hypercholesterolemic (xanthomatous) tendency? A series of recent clinical studies demonstrates conclusively that this question must be answered in the positive. People with coronary atherosclerosis (as a group) exhibit higher plasma total cholesterol levels than do people in an apparently normal group. However, the fact remains that some individuals with atherosclerosis definitely have plasma cholesterol levels in the presumably normal range. Hence the problem remains: What is the relationship, if any, between cholesterolemia and atherosclerosis in such persons?

COLLOIDAL STATE OF AGGREGATION OF CHOLESTEROL IN PLASMA

Grappling with this question, several investigators have elaborated a fresh approach to the problem of the relationship between the lipids and atherosclerosis. This approach focuses attention upon the interrelations among the plasma lipids. It emphasizes the possible significance for atherogenesis of variation in the state of aggregation of plasma lipids and lipoproteins. It stresses the fact that the absolute level of plasma cholesterol may not be the key variable in atherogenesis, since this is a datum highly incomplete with respect to cholesterol itself.

Water-insoluble, hydrophobic cholesterol exists in a state of colloidal solution in biologic systems. Cholesterol-containing colloidal aggregates (micelles) are complex structures with respect to size, configuration and composition. Their constituents are not only the other plasma lipids (phospholipids, fatty acids), but also proteins. Presumably qualitative and quantitative alterations may occur in particular plasma cholesterol-containing lipoprotein micelles with little or no over-all quantitative change in the plasma total cholesterol concentration. Presumably such discrete biochemical changes may influence atherogenesis. Presumably such changes may be significantly related to atherogenesis in normocholesterolemic and hypocholesterolemic humans.

These possibilities are being explored by several groups of investigators. Their work has already led to the emergence of several new hypotheses concerning the lipids and atherogenesis.*

One such concept is that atherosclerosis in man is secondary to alimentary hyperlipemia. It stresses that the dietary regimens current in western countries lead to repeated bouts of postprandial hyperlipemia. Gross plasma lactescence supervenes due to a marked rise in circulating lipids of large particle size (hyper- and macro-chylomicronemia). It is postulated that these macrochylomicrons are subject to phagocytosis by intimal macrophages with the formation of intimal foam cell plaques. Thus, the initial stage of atherogenesis is a response to diet-induced alterations in the state of aggregation of plasma lipoproteins.

A second concept dealing with atherogenesis and the state of aggregation of plasma lipids stresses the significance of the relationship between plasma cholesterol and phospholipid. Normally, plasma total cholesterol and lipid phosphorus parallel each other closely. Hence, the plasma total cholesterol/lipid phosphorus (C/P) ratio is more constant than the concentration of either individual lipid. Several recent clinical studies present data suggesting that an increased C/P ratio is essential for atherogenesis.

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*A few of these concepts are presented in brief since limitations of space render impossible any critical analysis in this presentation; cf. the forthcoming monograph "Experimental Atherosclerosis." [1]

Of the recent studies on the state of aggregation of cholesterol in plasma and its possible relationship to atherosclerosis, probably the most significant are those on the various classes of cholesterol-bearing lipoprotein molecules. These investigations are based on ultracentrifuge identification and quantitative characterization of species and classes of lipid-bearing protein molecules of plasma—molecules which exhibit different characteristic (*Sf*) rates in the ultracentrifuge. These quantitative ultracentrifuge technics are being used to clarify whether in atherosclerosis the physical chemical state of the blood lipids might be of more significance than the analytic levels themselves. In brief, studies to date in both man and animals suggest that molecules of the *Sf* 12-20 class are related to atherosclerosis. These molecules are not present in all human sera and, when present, they vary in concentration* These molecules of class *Sf* 12-20 implicated in atherogenesis are not part of acute alimentary lipemia.† Their plasma concentration cannot be predicted from the analytic total serum cholesterol level. Partial dietary restriction of fat and cholesterol in man results in a gradual decrease in their level over a period of weeks to months.‡ They are present with a much higher frequency and at higher concentrations in patients who have suffered a myocardial infarction. They are also increased in diseases associated with atherogenesis, e.g., diabetes mellitus, the nephrotic syndrome, hypothyroidism, xanthomatosis, hypertension. Further, hypertensives who have coronary artery disease have higher *Sf* 12-20 levels than do individuals with uncomplicated hypertension. Similarly, diabetics with vascular disease have higher *Sf* 12-20 levels than do diabetics without such complications; and patients with recurrent myocardial infarction exhibit higher levels than do patients who remain free of recurrences. Finally, diet-induced reductions in *Sf* 12-20 levels are capable of giving individuals with previous coronary infarctions significant protection from recurrences. These and other findings are the basis upon which *Sf* 12-20 cholesterol-bearing lipoprotein molecules have been implicated as pathogenic factors in atherosclerosis.

The study by various methods of the state of colloidal aggregation of cholesterol in plasma is a departure in atherosclerosis research still in its early stages. The fundamental significance of its findings cannot yet be definitely evaluated. However, this important new research path points the way to a possible resolution of a number of unclarities plaguing investigators in the atherosclerosis field. Moreover, the results of this work to date, regardless of possible areas of disagreement concerning their interpretation, are major new sources of evidence supporting the cholesterol concept of atherogenesis.

EXPERIMENTAL ATHEROSCLEROSIS

Alongside the active research assault on atherosclerosis by clinical investigators a similar endeavor is proceeding in the animal laboratory. The findings on man constitute the firm clinical background for the cholesterol concept of atherogenesis. In turn, this concept is being extensively reinforced by the latest experimental findings in animals.

Historical note: Experimental atherosclerosis was first successfully induced in animals in the period 1908 to 1912. Prior to that time, all experimental attempts to reproduce the atherosclerotic lesion of man had failed, although arterial lesions had been produced by a number of procedures in animals. However, the resultant changes in the vessels resembled the Mönckeberg type of human arteriosclerosis (medial calcinosis, senile arteriosclerosis) rather than atherosclerosis. In 1908 a group of investigators working in St. Petersburg, Russia studied the effects of various dietary regimens on vascular pathology. They observed that rabbits fed diets containing meat, milk or eggs developed atherosclerosis. It was soon demonstrated, particularly by Anitschkow, that the specific atherogenic factor was cholesterol. Experimental atherosclerosis as a definitive field of research endeavor dates from these discoveries. It is noteworthy that to this day experimental atherosclerosis has not been successfully produced by any means other than cholesterol administration (except avian stilbesterol-induced atherosclerosis, a lesion secondary to endogenous endocrine-stimulated hypercholesterolemic hyperlipemia).

Species differences: One of the most significant achievements of the last decade has been the consistent experimental production of gross atherosclerosis in laboratory species other than

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*Molecules of the *Sf* 3-8 class are present in all plasmas examined to date. Although they are cholesterol-bearing, they apparently are not related to atherogenesis.

†In association with postprandial alimentary lipemia, molecules of *Sf* 75 or greater emerge in plasma. These also do not appear to be related to atherogenesis.

‡Marked restriction of dietary neutral fat and cholesterol intake may also effect a depression in plasma cholesterol levels.

the rabbit. For years, many investigators doubted that cholesterol-induced atherosclerosis in the herbivorous rabbit bore any relationship pathogenically to the human lesion. Their skepticism was reinforced by the inconclusive or negative results of efforts to produce the lesion in other species, particularly omnivores and carnivores.

When a program of atherosclerosis research was launched over a decade ago in the Cardiovascular Department of the Michael Reese Hospital, a considered approach was taken to clarify the precise significance of the foregoing criticism. A conscious attempt was made to seek out an experimental animal more suitable than the rabbit. After a careful survey of the existing literature, the chick was selected. This avian species spontaneously develops a gross arterial lesion similar to human atherosclerosis. It is omnivorous. As was quickly demonstrated in initial experiments, it responds to cholesterol feeding by developing gross atherosclerosis of the major arteries. Moreover, it responds to chronic estrogen administration by exhibiting a sustained hypercholesterolemic hyperlipemia and eventually developing atherosclerotic lesions. Hence, the chick affords an opportunity to study three types of atherosclerosis: spontaneous, cholesterol-induced and stilbesterol-induced. This unique versatility renders this species particularly useful in atherosclerosis research.

More recently, it has been demonstrated that gross atherosclerosis can be consistently produced in dogs by combined thiouracil-cholesterol feeding. This research achievement further reinforced the concept that atherosclerosis in both human and animal species has a similar basic pathogenesis. Today, therefore, a positive approach is indicated toward the problem of species differences in susceptibility to atherogenesis. Intensive research is in order to clarify the metabolic bases for these differences. Undoubtedly their elucidation will contribute significantly to our general understanding of the atherosclerosis problem.

Morphology of experimental atherosclerosis in chicks: In several publications from this department, a detailed description has been given of the morphology of spontaneous, cholesterol-induced and estrogen-induced atherosclerosis in cockerels. This material cannot be reviewed within the space limitations of this paper. However, several specific points may be noted: (1) The chick spontaneous lesion in the intima of the aorta (and in the coronary intima) is almost certainly primarily a fibrotic process, i. e. is an arteriosclerotic (not atherosclerotic) lesion.

(2) Both cholesterol feeding and estrogen exhibition aggravate and intensify spontaneous aortic lesions. It would appear that the fibrotic spontaneous plaque is a site of predelection for cholesterol and lipid deposition, with subsequent evolutionary atherosclerotic changes.

(3) The primary lesion of both experimental cholesterol- and estrogen-induced atherosclerosis is the foam cell intimal cushion. This lesion, so-called pure atheroma, is almost certainly the first stage of experimental atherogenesis. The morphologic patterns of more advanced lesions are apparently the result of evolutionary pathologic processes secondary to atheroma formation and continued lipid deposition.

(4) It is possible by prolonged cholesterol feeding to induce in chicks the spectrum of atherosclerotic changes seen in human lesions, including foam cell plaques, necrosis and atheromatous abscesses, fibrosis and hyalinization, calcification and cartilaginous-osseous metaplasia. Ulceration of atherosclerotic plaques with thrombus formation is the only lesion seen in man that has not been observed in cholesterol-fed chicks.

(5) Cholesterol feeding induces gross and/or microscopic lesions throughout the arterial tree of the experimental animal, including the aorta, renal, cerebral, and coronary arteries.

(6) It is noteworthy that estrogen-induced atherosclerosis occurs principally in the aorta, with the coronary vessels conspicuously immune to this process.

The question has been repeatedly posed: Are experimental and human lesions morphologically similar? Even the most severe critics of the cholesterol concept of atherogenesis cannot fail to note the conspicuous similarities between cholesterol-induced lesions—whether in rabbit, dog or chick—and the lesions seen in man. Taking into consideration the anatomic differences among the various species in architecture of the great vessels, the similarities between experimental and human lesions are indeed remarkable. That this resemblance is more than fortuitous pathogenetically is further emphasized by the fact that such lesions have not been produced experimentally by any other means.

Quantitation of experimental atherosclerosis: Another significant achievement of recent atherosclerosis research has been the precise quantitation of the interrelationships among dietary cholesterol intake, hypercholesterolemia and atherogenesis. In the chick, both degree of hypercholesterolemia and intensity of atherogenesis parallel the level of dietary cholesterol intake. Such stepwise quantitation can be demonstrated with diets containing from 0.25 to 2 per cent cholesterol. The demonstration of these interrelationships affords further support for the cholesterol concept of atherogenesis, since it indicates a close quantitative parallelism between degree of diet-induced hypercholesterolemia and intensity of atherogenesis. Further, this demonstration has significance methodologically: The achievement of quantitation in atherosclerosis experiments renders valid attempts to assess graded influences of various factors (endogenous and exogenous) on the atherogenic process.

Experimental atherosclerosis without gross hypercholesterolemia and organ cholesterosis: As already noted, atherosclerosis in man frequently occurs in the absence of gross hypercholesterolemia. In contrast, experimental cholesterol-induced atherosclerosis is usually associated with marked hypercholesterolemia and organ cholesterosis. Those who question the significance of experimental cholesterol-induced atherosclerosis stress this difference. However, recent studies indicate that this is not a fundamental discrepancy. Thus it is possible to induce atherosclerosis in cockerels with only minimal concomitant hypercholesterolemia and organ lipidosis. Chicks fed a mash supplemented with 0.25 per cent cholesterol exhibit minimal alterations in lipid patterns. With only minimal elevations in plasma and tissue lipid concentrations, these birds eventually develop typical gross cholesterol-induced coronary and aorta lesions. These findings on the aorta in chicks are in accord with previous experimental observations of Anitschkow and others in rabbits.

These results in rabbit and chick are particularly significant in light of the latest data demonstrating that an "xanthomatous tendency" (minimal hypercholesterolemia) prevails in many people with atherosclerosis.[*]

Reversibility of experimental atherosclerosis: Among the several dogmas in the atherosclerosis literature, none is more invalid than the thesis that atherosclerosis is an irreversible lesion. Considerable clinical evidence has accumulated refuting this notion. These data on man demonstrate that not only juvenile fatty streaks but also more developed atherosclerotic lesions in older people can regress and be resolved. The experimental data are even more clear-cut. Regression of lesions is readily demonstrable in rabbits and chicks rendered atherosclerotic by cholesterol feeding. When such animals are returned to a normal diet after a prolonged period on a cholesterol regimen, hypercholesterolemia sooner or later disappears. During the ensuing weeks and months, definite regression and healing occur of cholesterol-induced atherosclerotic lesions in both the coronary arteries and aorta. Less advanced lesions may be completely resolved. More severe lesions may regress only partially, with persistency of fibrocalcific plaques. Undoubtedly these findings in chick, rabbit and man compel the conclusion that atherogenesis is at least a partially reversible process.

This conclusion is further reinforced by recent studies in our laboratory demonstrating that cholesterol-induced *coronary* atherosclerosis in chicks is reversed by estrogen exhibition, even when cholesterol feeding is continued throughout the period of hormone exhibition.

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[*] This tentative conclusion does not detract from the fact that the moderate hypercholesterolemia of many atherosclerotic humans is the result of endogenous disturbances in lipid metabolism and not of the dietary level of cholesterol ingestion.

(Part two will follow in the August issue of THE JOURNAL-LANCET)

Reprinted from
1870

THE WHITE of an egg has proved of late the most efficacious remedy for burns. Seven or eight applications of this substance soothes pain and effectually excludes the burn from the air. This simple remedy seems preferable to collodion or even cotton. Extraordinary stories are told of the healing properties of a new oil which is easily made from the yolk of hen's eggs. The eggs are first boiled hard, and the yolks are then removed, crushed, and placed over a fire, where they are carefully stirred until the whole substance is just on the point of catching fire, when the oil separates and may be poured off. One yolk will yield nearly two teaspoonsful of oil. It is in general use among the colonists of South Russia as a means of curing cuts, bruises and scratches.—*Boston Journal of Chemistry.*

THE JOURNAL-LANCET (*Northwestern Medical and Surgical Journal*) 1:23, 1870.

Lancet CLINICAL REVIEWS

This department of The Journal-Lancet *is devoted to reports on cases in which all the appropriate diagnostic criteria have been employed, the best known treatment administered and the results recorded. It is desired that these case reports be so prepared that they may be read with profit by physicians in general practice, hospital residents and interns and may be of considerable value to junior and senior students of medicine. This department welcomes such reports from individuals or groups of physicians who have suitable cases which they desire to present.*

Clinicopathological Conference

Minneapolis Veterans Hospital*

Edited by James F. Hammarsten, M.D.
Assisted by N. L. Gault, M.D.
Minneapolis, Minnesota

PRESENTATION OF CASE

A laborer, 57 years of age, was admitted to this hospital on August 24, 1951 because of a chronic cough.

He had had a chronic nonproductive cough for 15 years. In 1947 he was acutely ill for two weeks with fever up to 102° F., cough productive of one-half cup of sputum daily, and a small amount of hemoptysis once. He was treated by his local physician but continued to have productive cough. X-ray studies performed by his local physician were interpreted by a University of Minnesota radiologist as showing increased density in the right upper lobe with multiple emphysematous blebs in this area. Bronchograms showed diffuse narrowing of the small bronchi of the right upper lobe.

He was admitted to the University Hospitals on January 22, 1948 for further studies. Physical examination at that time showed dullness to percussion over the right apex with bronchial breathing and increased vocal fremitus in the same area. The trachea was deviated to the right. A lymph node was palpable in the right supraclavicular area.

The significant laboratory findings at the University Hospitals were a white blood cell count of 13,200 per mm.^{3} with 60 per cent neutrophils, an erythrocyte sedimentation rate of 94 mm. in one hour, a tuberculin reaction in a dilution of 1:1000 and numerous sputum examinations negative for acid-fast bacilli.

Numerous x-ray studies were performed at the University. X-ray films of the chest showed thickening of the pleura over the right apex and obliteration of the right costophrenic angle (figure 1). There was infiltration and multiple emphysematous blebs in the right upper lobe. Planigrams demonstrated diffuse annular constriction of the right upper lobe bronchus (figure 2).

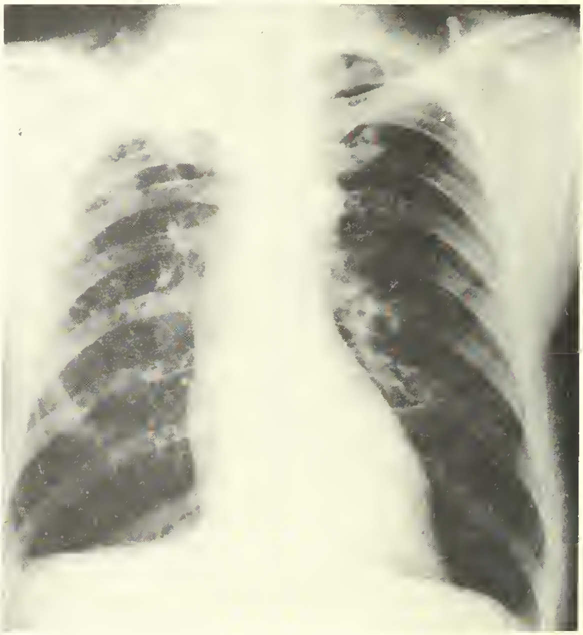

Fig. 1. X-ray film of the chest in 1948 showing thickened pleura over the right apex, obliteration of the right costophrenic angle, and an infiltration in the right upper lobe.

Bronchoscopy was negative except for thickening of the mucosa in the region of the carina and the orifice of the right upper lobe bronchus. Sputum was negative for tumor cells and the supraclavicular lymph node was normal. He

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*Published with approval of Chief Medical Director. The statements and conclusions published by the authors are the result of their own study and do not necessarily reflect the opinion or policy of the Veterans Administration.

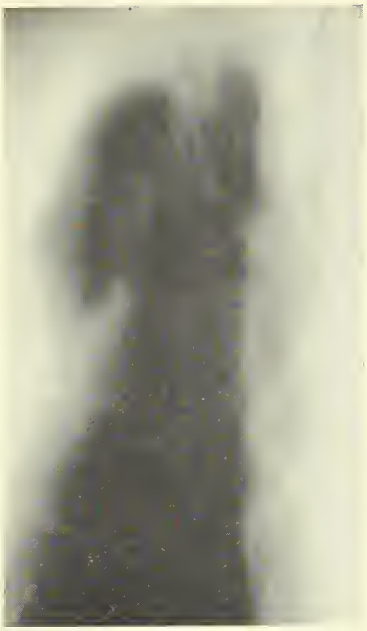

Fig. 2. Planigram in 1948 showing the infiltration in the right upper lobe and diffuse constriction of the bronchus to that lobe.

was discharged from the University Hospitals on January 31, 1948.

He was followed in the University out-patient department until February 1949. The chest lesion showed some improvement and then remained stabilized. His symptoms abated somewhat. He never regained his usual vigor. He had occasional episodes of cough productive of a yellow-white sputum and eight to ten episodes of bright red blood in the sputum.

Three weeks prior to admission to this hospital he developed anorexia and the cough became almost constant and productive of one-half cup of sputum daily. For two months he had mild exertional dyspnea.

He smoked one package of cigarettes and several pipefuls of tobacco daily. The family and past history were not significant.

Physical examination revealed a thin, underdeveloped man in no acute distress. The trachea was in the midline. The diaphragm appeared to be elevated on the right. There was dullness to percussion over the lower half of the right posterior chest. There were numerous inspiratory and expiratory rhonchi with moist rales over the area. There was atrophy of the right testicle. There were numerous small nodes in the left axilla and one moderate-sized node in the right axilla. There was mild clubbing of the fingers and toes.

The temperature was 101.8° F., the pulse rate 86 per minute and the blood pressure 100 mm. Hg systolic and 60 diastolic. The vital capacity was 3.8 liters.

The hemoglobin was 11.4 gm. per 100 ml., the hematocrit 41 per cent, the red blood cell count 4.55 million per mm.^{3}, the MCD 8.2 microns, MCV 92 microns^3, MCH 25 micromicrograms, MCC 28 per cent, and the reticulocyte count one per cent. The erythrocyte sedimentation rate was 102 mm. in one hour. The white blood cell count was 26,150 per mm.^{3} with 75 per cent neutrophils, 23 per cent lymphocytes, 1 per cent eosinophils, and 1 per cent basophils. The white blood cell count decreased to 16,200 per mm.^{3} with 53 per cent neutrophils, 38 per cent lymphocytes, 8 per cent eosinophils, and 1 per cent basophils. The blood Kahn was negative. A urinalysis was normal.

The blood urea nitrogen was 13.2 mg. per 100 ml. and the blood glucose 93 mg. per 100 ml.

Sputum cultures showed Neisseria catarrhalis and nonhemolytic streptococci. Numerous sputum examinations were negative on direct smear for acid-fast bacilli. X-ray films of the chest showed deviation of the mediastinum to the right, an extensive fibrotic lesion involving the entire right lung with multiple areas suggestive of bronchiectasis, and thickened pleura on the right. A second x-ray film of the chest showed, in addition, what appeared to be a cavity with a fluid level in the apex of the right lower lobe (figure 3). Planigrams confirmed the previous findings including the presence of numerous cavities (figure 4). The bronchi were not obstructed. The upper and lower branches were

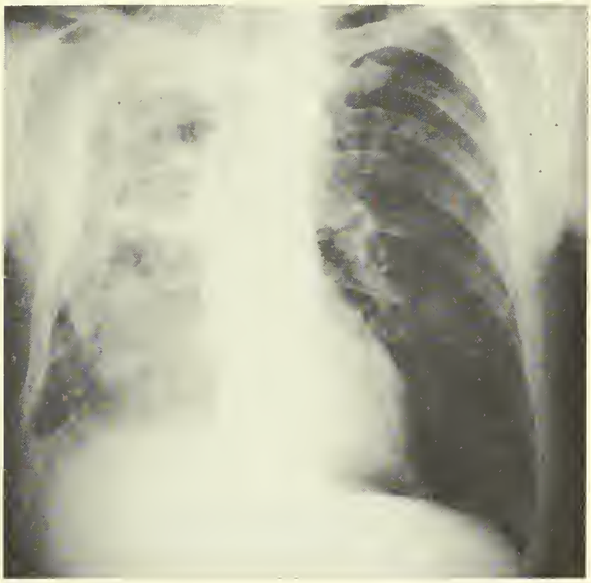

Fig. 3. X-ray film of the chest in August 1951 showing deviation of the trachea to the right, thickened pleura on the right, and an extensive fibrotic lesion with multiple areas suggestive of bronchiectasis involving the right lung.

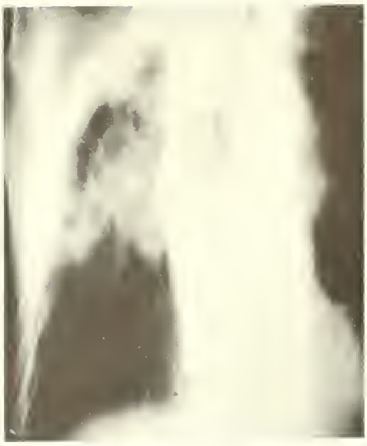

Fig. 1. Planigrams in August 1951 demonstrating the same changes as described in figure 3 and showing a mass between the right middle and lower lobe bronchi.

separated by what appeared to be a large node.

Bronchoscopy showed thick purulent secretion in the right main bronchus. The mucosa of the right upper lobe orifice was edematous and the orifice apparently somewhat reduced in size. There was "diffuse inflammatory reaction" throughout the bronchial mucosa of the right side. The material aspirated was negative for tumor cells and acid-fast bacilli.

The tuberculin test was negative in the first strength dilution and the second strength showed a 2 cm. area of redness and induration.

He became afebrile and his cough decreased after aureomycin therapy. On September 27, 1951 an operation was performed.

DISCUSSION

DR. LEO RIGLER*: This case illustrates the possibility of demonstrating gross pathology by x-ray examinations. It also emphasizes that we have a more difficult time specifying the etiology. The pathologist may have trouble with that also and have to rely on the bacteriologist. Too often the bacteriologist fails us in these particular circumstances as he did here.

The first x-ray films in 1948 (figure 1) show that the trachea is deviated to the right. There is also a dense shadow in the right apex with diffuse linear strands extending from the hilum to the dense homogeneous area in the apex. The diaphragm on the right is distinctly flattened to such an extent that its attachments are visible. It is often difficult to distinguish between true adhesions and the diaphragmatic attachments. In this instance the diaphragm is somewhat elevated so that I would suspect that there are some actual adhesions.

X-ray films of the chest taken sometime later show the same changes, but, in addition, an entirely new infiltration appears in the right lung and then disappears.

The planigrams are very interesting (figure 2). The right upper lobe bronchus is higher than it normally should be. That is to be expected. This patient has a lesion which is retracting the trachea to the right and which is producing enough scar formation to pull the entire hilum up. The upper lobe bronchus is badly distorted. All of this fits with a diffuse fibrosis of the lung. The planigrams (figure 2) also show an area of rarefaction. This suggests either a cavity or a localized bronchiectasis.

I would say at this point that the patient has a diffuse scar-forming process in the upper lobe with superimposed pneumonitis that comes and goes. This chronic disease is not producing any very considerable stenosis of the major bronchi. It appears to begin in the parenchyma of the lung and produce the bronchial changes by surrounding the bronchi.

The subsequent x-ray films show considerable changes (figure 3). The trachea is further to the right than it was. The process, previously limited to the right upper lobe, has now involved the remainder of the right lung. Some of this extension may be acute pneumonitis, but most of it is a diffuse fibrotic change with multiple bronchiectatic cavities or perhaps actual cavities in the lung.

The lateral view (figure 5) demonstrates ky-

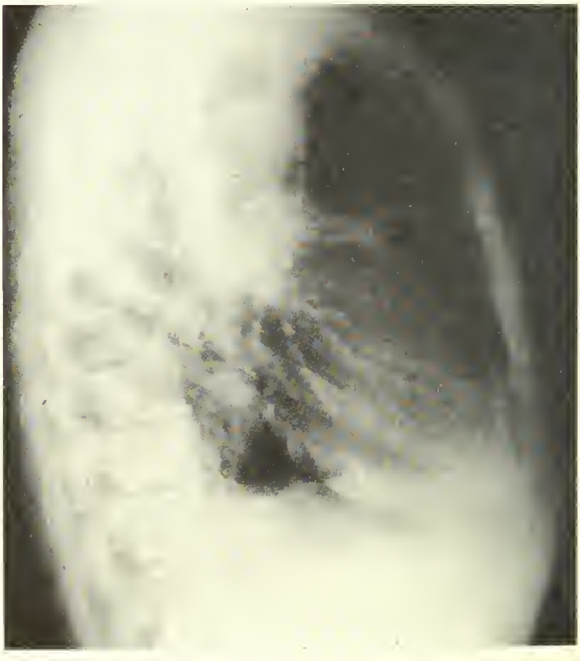

Fig. 5. Lateral view of the chest in August 1951 showing kyphosis of the spine, low diaphragms, and a mass in the root of the lung.

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*Professor of radiology, University of Minnesota, Minneapolis, Minnesota.

phosis of the spine, bulging of the sternum, and low diaphragms. These are the usual changes of pulmonary emphysema. The diaphragm is not as low as it was. That suggests that the lung has pulled up the diaphragm in addition to retracting the trachea. There is one thing that is disturbing about the lateral view. That is the enlargement in the region of the root of the lung. With repeated infections the lymph nodes about the hilum may enlarge, but whenever enlargement of the root of the lung is seen tumor is a possibility.

On the planigrams, in between the upper and lower lobe bronchi, is the shadow of a large mass (figure 4). I believe this corresponds to that seen on the lateral view. This mass is larger, rounder, and more sharply defined than would be expected from just an inflammatory process. The bronchi are not especially contracted but are deformed and displaced which suggests that the mass is not originating in the major bronchi. The planigrams also demonstrate multiple areas of cavitation.

It is rather unusual for an inflammatory process to produce a mass at the root of the lung. Most of the time a mass such as is seen here means a tumor and usually, of course, it means carcinoma. It would be unusual for a carcinoma to produce a course such as this patient had. A benign adenoma of the bronchus could account for the course because with an adenoma the obstruction may be remitting. However, a benign adenoma should be evident on the bronchograms or planigrams. A carcinoma arising in the periphery and extending to the hilum would not produce the sequence of events seen in this case.

I would be inclined to put it together by saying that he had a chronic inflammatory disease and a carcinoma arising in the periphery with metastases to peribronchial lymph nodes. The etiology of the inflammatory disease could be tuberculous or fungous but most likely will not be determined.

DR. HELLER: Would the absence of tubercle bacilli in the sputum definitely rule out tuberculosis?

DR. RIGLER: If this is tuberculosis with this degree of cavitation, tubercle bacilli should be found in the sputum. Furthermore, with the extent of this process, if it is tuberculosis, I would expect it to have spread to the opposite side. That is evidence against tuberculosis without being conclusive.

DR. HELLER: Would the degree of pleural involvement favor tuberculosis?

DR. RIGLER: No, I don't think so. The chronic lung fibrosis following pneumonia of unknown etiology often has an extremely thick pleura.

DR. TUCKER: Do you think there could have been a tumor in the right apex all of the time with pneumonitis accounting for the other changes and then a hilar component later on?

DR. RIGLER: Tumors in the apices are usually rather malignant. They erode ribs and produce a Horner's syndrome very rapidly. This man was ill from 1947 to 1951 so that it seems improbable that he had a pulmonary sulcus tumor.

DR. STEAD: I saw this patient and thought he had a bronchial adenoma with the major portion of the adenoma extra-bronchial.

DR. RIGLER: I have seen a number of bronchial adenomas of that type and very few have shown pleural involvement. In addition, such a tumor should show some endobronchial involvement; otherwise where would the bronchial obstruction come from?

DIAGNOSES

Clinical diagnosis: Bronchial adenoma? Chronic interstitial pneumonitis?

Dr. Rigler's diagnosis: Chronic interstitial pneumonitis. Bronchogenic carcinoma with metastases to the hilar nodes.

Anatomical diagnosis: Chronic interstitial pneumonitis.

PATHOLOGICAL DISCUSSION

DR. GLEASON: The operation was a pneumonectomy. The pleura measured up to 2 cm. in thickness. The lung was shrunken and contained dense cords of scar tissue. The mass which was seen on the x-ray films was an area of more dense scar tissue. There were numerous bronchiectatic cavities. On microscopical examination the upper lobe showed no identifiable lung tissue. The middle and lower lobes showed scar tissue and organizing pneumonitis. We found no evidence of specific etiology.

DR. RIGLER: Years ago Sante reported a series of these cases that he called "chronic cirrhosis of the lung." It was a chronic scar-forming process with repeated infections resulting in bronchiectasis and scar.

DR. STEAD: Are there any organisms which are likely to lead to this type of chronic pneumonitis?

DR. HALL: No. Certainly this is not the course of a pneumococcic or a Friedlander's pneumonia. The bacteriologist is of no particular help unless he has a chance to see the patient during his initial infection.

DR. BELL: I feel that almost any organism that produces pneumonia can do this.

Case Presentation

HOWARD A. ANDERSEN, M.D.*
Rochester, Minnesota

A WHITE WOMAN, 53 years of age, registered at the Mayo Clinic November 9, 1951, complaining of recurrent epigastric pain which had been present for eighteen years. This distress had been much worse in the past five weeks and had extended into the back. Nausea and vomiting had been present.

Examination disclosed no abnormalities except a gastric ulcer, 1.5 cm. in diameter, located near the lesser curvature of the stomach at about the level of the incisura angularis. There was considerable prepyloric spasm, together with some dilatation of the stomach and retention of gastric contents. A roentgenogram of the thorax showed normal conditions except for linear fibrosis at the base of the left lung.

On November 20, 1951, partial gastrectomy was performed, resulting in the removal of about 65 per cent of the stomach, the excised part of which contained a benign gastric ulcer. Anesthesia was induced by means of intravenously administered Pentothal Sodium and maintained by use of ether administered through an intratracheal tube. The total time of administration of these anesthetic agents was two hours, and the patient tolerated the procedure very well. A transfusion of 500 cc. of blood was administered while the patient was in the operating room. While in the postanesthetic room she suddenly became cyanotic and had some respiratory difficulty for three or four minutes only. The remainder of the immediate postoperative course was uneventful.

As the days progressed, an almost daily elevation of temperature to 101° F. was noted, and the pulse rate varied from 80 to 120 beats per minute. One week following operation she became dyspneic and coughed up a small amount of bloody sputum. No pain in the thorax was noted at any time and there was no tenderness in either calf or leg. The following day a portable roentgenogram of the thorax taken when the patient was recumbent disclosed a diffuse opacity in the right side of the thorax. This was repeated on Novembe 30 when the patient was upright and at this time there was evidence of hydropneumothorax on the right with partial collapse of the right lung. There was a second fluid level, which appeared to be intrapulmonary (figure 1). Administration of penicillin was started and a catheter was inserted into the right pleural space to produce temporary closed intercostal suction and drainage. A small amount of foul sanguinopurulent fluid was obtained. This treatment produced some improvement in the respiratory symptoms and fever, but except for slight lowering of one of the fluid levels, the roentgenographic appearance remained the same. On December 6 fever increased again and the temperature continued to be elevated daily to approximately 101°. The pulse rate varied from 80 to 120 and respirations varied from 20 to 36 per minute. The patient gradually became more dyspneic. Bronchoscopic examination was performed on December 10 and disclosed marked narrowing of the right main bronchus thought to be caused by external compression. A thoracotomy was advised and planned from December 17. On December 15, while returning from the bathroom, the patient suddenly became dyspneic, ashen-gray and displayed a rapid pulse rate and clammy skin. Blood pressure expressed as millimeters of mercury was 70 systolic and 30 diastolic. Fifteen minutes later she died without having complained of pain at any time.

COMMENT

It was agreed that the most likely immediate cause of death was a massive pulmonary embolus, but there was considerable doubt as to the nature of the postoperative difficulty in the right hemithorax.

The presence of both intrapleural and extrapleural fluid levels made the diagnosis of an acute lung abscess with a bronchopleural fistula and empyema appear to be the most likely possibility. The pathogenesis of this, however, was a subject of considerable conjecture. Pneumonitis from aspiration of gastric contents during surgical procedures is very common, but use of an intratracheal tube as was done in this case reduces markedly the incidence of this complication. There was no postoperative vomiting to predispose to the inhalation of foreign material. The presence of an intrabronchial obstructing lesion could not be ruled out with certainty, but the preoperative roentgenogram of the thorax and bronchoscopic examination disclosed no evidence of this. It was suggested that spontaneous pneumothorax, unrelated to operation, could have occurred, with subsequent persistent bronchopleural fistula and empyema. Postoperative atelectasis will occasionally produce a course such as this patient experienced. The history of the episode of transient cyanosis

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*Division of Medicine, Mayo Clinic, Rochester, Minnesota.

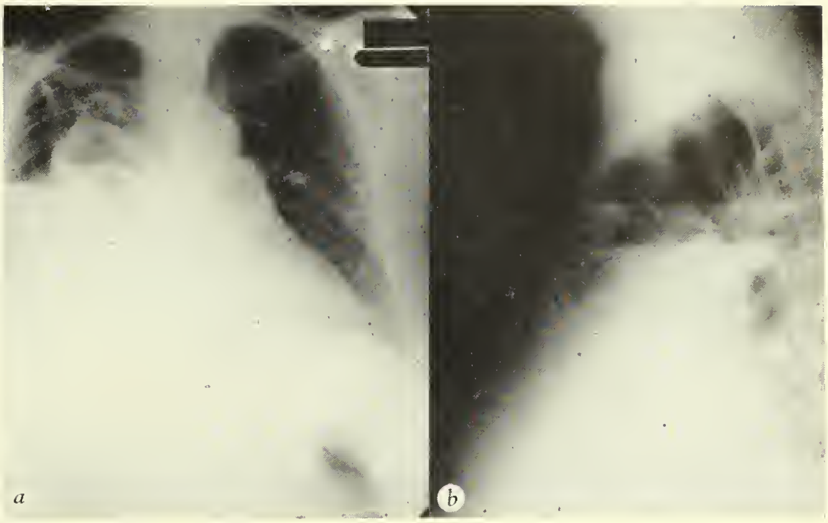

Fig. 1. Hydropneumothorax with fluid levels on the right. (a) Anteroposterior view; (b) Lateral view.

and respiratory difficulty immediately following operation, together with the appearance of the roentgenogram ten days later, made atelectasis a plausible explanation, but the clinical appearance was certainly not pathognomonic. The pulse rate and temperature did not remain high, as they usually do in such instances, but fluctuated considerably from the onset of this patient's difficulty.

Finally, could a pulmonary embolus produce a course such as this? If so, when did embolism occur? It is unusual for this complication to arise within a few minutes after surgical intervention, at which time the cyanosis and respiratory difficulty were noted in this patient. If it occurred at about the time when hemoptysis appeared, which was six or seven days following operation, it seemed that there was insuffi- noted on the roentgenogram ten days after op- cient time for the development of the changes eration. Necrosis in a pulmonary infarction with abscess formation followed by rupture into the pleural space and empyema is known to occur, and this sequence of events was entertained as a definite possibility. The diagnosis of pulmonary embolism is usually one of exclusion, however, and in this case the consensus was that the postoperative complication was of bronchial origin.

FINAL DIAGNOSIS

At necropsy massive bilateral pulmonary embolism was noted as the immediate cause of death. In addition, there was an old pulmonary infarct with considerable necrosis and suppuration which involved the entire lower lobe of the right lung. A bronchopleural fistula and empyema were present. Pseudomonas aeruginosa was cultured from the pleural fluid. Small thrombi were noted in the deep veins of each leg. It was considered likely that the initial embolism most likely occurred in the immediate postoperative period and was manifested by the episode of transient cyanosis and dyspnea.

Reprinted from
1870

"Nowhere in the world are the sick more skillfully and more successfully treated than in America, but it is time we should cease to depend upon Europe for the raw scientific material which we use to such advantage. There are enough skilled nurses or practitioners in America. There is a paucity of scientific workers.

Supposing the case that a young man has several years to spare at the commencement of active life, the surroundings at home are not conducive to study. Considering the advantages here and there to be the same, there is still a scholarly atmosphere here in which the student lives and moves. The unaccustomed excitement and the temptations of the large cities of Europe may demoralize the pleasure-seeker, but they have little or no effect upon the true student. A young man here often plods along steadily, who at home would be inevitably distracted by the allurements of society and friends, hampered by desire to get into practice, or perhaps decoyed by that direst of foes to scientific study, the desire of making money."

George H. Fox: Medical study abroad. *Northwestern Medical & Surgical Journal* (The Journal-Lancet) 3:5-12, 1872.

This is the ninth in a series of letters to Dr. J. A. Myers and the readers of the JOURNAL-LANCET *from Dr. Ancel Keys, director of the laboratory of physiological hygiene at the University of Minnesota, during a year of study and travel abroad. Other letters will follow in subsequent issues.*

Notes from a Medical Journey

16 May 1952

Instituto de Investigaciones Medicas, Facultad de Medicina
Ciudad Universitaria, Madrid, Spain

Dear Jay:

What a contrast between Spain and England -- and between laboratories in Madrid and in Oxford! Spain is angular and sunny while England is gentle and moist. Here in the "University City" all is new since the Spanish Civil War and many of the handsome buildings are not yet finished. In the Institute of Medical Research, where we are, the big tile-walled laboratories are well fitted with modern benches and cupboards and all is spotless. The windows look out on the sun-drenched plain and the Guadarama Mountains, still snow-capped in May, and there is a pervading sense of space and even emptiness. In Oxford the laboratories, inside and out, are mostly a jumble of antiquity with random additions of all ages, and every bench and corner is crowded with a litter of past and current research and, I must report, a great deal of dirt. Madrid could use many more researchers and Oxford could stand a lot of laboratory reorganization and housecleaning.

Madrid has tripled its population (now over 1,600,000) in the last 50 years but the city is laid out on a grand scale. There are many streets wider than Michigan Boulevard in Chicago and most of the side streets are as wide as the main thoroughfares in the Twin Cities. But in Oxford, as in all England, the narrow streets twist and wind about to the despair of drivers in a hurry who, nevertheless, scrupulously observe every injunction of traiffic signs and police. In Madrid there seem to be more traffic cops and other police than automobiles but everyone drives all over the streets without signalling, U-turns are standard, and the cops blow whistles which are mostly ignored. Fortunately, there are really very few cars and therefore traffic jams are rare. We have our subjects in the workers' quarter of Vallejas, some eight miles from the lab through the heart of Madrid but I make it in twenty-minutes with a few drops of cold sweat.

We have been here only nine days but we are quite well settled and today we have the third lot of blood samples on hand. Our home is in the Residency of the "Consejo Superior de Investigaciones Cientificas (High Council of Scientific Research)" which has space for some eighty visitors who get full board and room and excellent service for about half what a hotel would charge. We have a suite with a nice study, a big bedroom and bath, and our balcony looks out over the city and the distant countryside sharply etched in the clear air. Since I must do quite a bit of writing, it is good to have a pleasant place to work in quiet.

As elsewhere, including the United States, there is some problem in getting clinically healthy subjects, especially in the age range of 30 to 60 which interests me most. But the Institute has lined up 100 families on whom full dietary data are being obtained by a team of visiting nurses and dietitians. Only when we know the dietary data are at hand do we call the families in to the local city clinic for examinations and blood sampling. Like most people elsewhere, at first there was some hesitation about venipunctures but I hope that word is getting around that these are neither painful or dangerous. Once the subjects get in the clinic they are friendly and cooperative. These are poor people but they have the traditional dignity and courtesy of the Spaniard. To get another side of the picture we shall study a series of medical students and members of the University staff.

The diet of the common people here is pretty plain -- bread and potatoes, with very small amounts of fish, meat, vegetables and fruits. Butter, eggs, and cheese are real luxuries and the milk supply is small and not very good. But there are few signs of "specifc nutritional deficiencies," about which I have more and more doubt anyway. The only real troubles we can spot are inadequacies of calories and, in the children, of calcium.

Since we eat almost all of our meals in the Residency -- less than ten minutes from the University by automobile -- our own diet is presumably representative of that of the middle-class and professional people in general. We find it quite good but not very interesting. I suppose it is some kind of a tribute that neither of us has, as yet, had an attack of the traveler's disease — dysentery; I have experienced the latter in Chile, Panama, Mexico, France and Italy. But there is plenty of dysentery in Spain and the mortality attributed, in the vital statistics, to "enteritis and dysentery" shows that there is a real public health problem involved, particularly in the more southern regions.

Madrid seems to be booming at present, reflecting the improving state of affairs in the country as a whole. Last year the crops were the best of the century and so far this year promises equally well. Fine new buildings are in construction in all parts of the city -- great blocks of flats, hotels and government buildings of great size and handsome proportions. The throngs of people on the streets are decently dressed, except in the poorest quarters, and they all seem cheerful. There is political quiet, though the diverse philosophies of the Church, the Falange and the Liberals are by no means reconciled. Of course the land is under a strict dictatorship and one of the most disturbing sights is the ubiquitous presence of soldiers and police wherever one looks. It is like pre-war Germany and Italy in this respect.

Last Sunday we went to the bull ring to find our seats with difficulty in the 28,000-capacity crowd. Franco and entourage appeared in the royal box with much fanfare and applause but no wild enthusiasm. The bulls were magnificent, and the toreadors brave and often amazingly skillful and graceful in the ritualistic contest, and the whole should have made a satisfactory afternoon. However, we came away with a rather bad taste in the mouth, unlike my recollection of bull fights in Mexico many years ago. The final kills were overly slow with most of the six bulls and we were annoyed by the incessant chatter of some obviously rich and very vulgar people behind us. Or, perhaps it is merely that age, as in some other respects, robs us of enthusiasm for some things that appeal to our younger years. I am reminded of my decreasing enjoyment of scientific and medical congresses. Twenty years ago a congress was apt to be the high point of the year; now I go out of my way to avoid a congress if possible. Next week there will be, here in Madrid, the Congress of the International Surgical Society but I doubt that I shall attend any of the sessions.

Anyway, we are very fit and young in heart. Or maybe I should say "spirit," since I am only too aware that I cannot testify to the state of our coronaries. If there were some means of determining the latter my research would be vastly easier. The weak point in all my current work is my inability to guarantee that my "clinically healthy" subjects are actually free from any major development of atherosclerosis. All of us who are working on the problem of coronary disease are in the same boat at present.

As ever,

Ancel Keys

Meet Our Contributors . . .

Howard A. Anderson was graduated from the University of Minnesota, specializes in internal medicine at the Mayo Clinic, Rochester, Minnesota.

★

Clarence V. Bateman, a graduate of Northwestern university in 1925, practices at Wahpeton, North Dakota, serves on the staff of St. Francis hospital, Breckenridge.

★

Melvin E. Beltz was graduated from the College of Medical Evangelists, practices in Wahpeton, North Dakota, serves on the staffs of St. Francis Hospital in Breckenridge and St. Mary's Hospital in Wahpeton.

★

Orpheus J. Bizzorlo was graduated from the University of Vermont in 1927, specializes in internal medicine in Waterbury, Connecticut.

★

Oliver Julian Harris was graduated from Tufts College medical school in 1940, is assistant physician at the Boston Dispensary and dermatologist at Boston Regional office of the Veterans Administration.

★

Louis Nelson Katz was graduated from Western Reserve University in 1921, is director of the cardiovascular department, Michael Reese Hospital, Chicago.

★

Rudolph W. Koucky was graduated from the University of Buffalo medical school, class of 1929, serves as pathologist with Fairview hospital, Minneapolis.

★

Arnold J. Kremen was graduated from the University of Minnesota in 1938, is associate professor of surgery at the University of Minnesota Hospitals.

Raymond S. Martin, Jr., M.D., was graduated from Vanderbilt Medical school in 1945, specializes in surgery at Jackson, Mississippi.

★

Oscar F. Noel was graduated from Vanderbilt medical school in 1942, practices surgery in Nashville and teaches at Vanderbilt.

★

Ruth Pick was graduated from German University medical school in Prague, is now a research associate, cardiovascular department, Michael Reese Hospital, Chicago.

★

Simon Rodbard was graduated from the University of Illinois, 1951, is assistant director, cardiovascular department, Michael Reese Hospital, Chicago.

★

Jeremiah Stamler was graduated from the Long Island College of Medicine in 1943, is a research associate, cardiovascular department, Michael Reese Hospital, Chicago.

★

Francis M. Thurmon was graduated from Harvard University in 1926, serves as physician in chief of the clinic of dermatology of the Boston Dispensary.

★

E. R. Wasemiller was graduated from the College of Medical Evangelists in 1945, practices at Wahpeton, where he is on the staff of St. Mary's hospital.

★

Glenn L. Wiltse was graduated from the College of Medical Evangelists, practices at Wahpeton, North Dakota, serves on the staff of St. Francis hospital in Breckenridge, Minnesota.

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Lancet Editorial

More or Safer Transfusions

Editor's Note: *We are fortunate in this issue of* The Journal-Lancet *to be able to present two different papers on blood transfusion, so vital a part of present-day medical and surgical care. In his article, "The History of Blood Transfusion," on page 319, Dr. Kremen discusses the background and development of the procedure. In this editorial Dr. Koucky presents the transfusion problems of modern hospitals and blood banks.*

Among the several radical changes in the practice of medicine within the past fifteen years is the increased use of whole blood. During the period from 1930 to 1935 there was in this country a ratio of about one transfusion to 150 to 200 hospital admissions, whereas today that ratio is about one transfusion to 8 to 10 admissions.

Although new therapeutic agents such as sulfonamides, antibiotics and the newer anesthetics can be as safely administered by the rural doctor as by his urban colleague, this is however not always true in the use of whole blood. In the case of transfusions, the physician is dependent to a large extent upon his laboratory technologist. The highly trained graduates of our college and university technology courses are limited in numbers and are not generally available to small hospitals. In these hospitals, the technologist often has been trained only in the fundamentals of laboratory methods. Nevertheless, these partially trained technologists are expected to prepare blood for transfusion.

Recent years have revealed the presence of hereditary antigenic blood factors heretofore unknown and have seen the development of more precise laboratory techniques in transfusion procedures. The Rh-Hr system with the various possible subgroups based on the C, D, E, c, d, e antigens, and factors within these subgroups such as C^w and D^u are examples of many recently found blood types. Grouping and cross-matching methods are complex and are changing frequently, as witness the high protein method of cross-matching and the Coombs' test as a cross-matching adjunct. Even the medical technologist who is a college graduate and who is working in the hospital laboratory may soon be left behind by this imposing array of refinements in transfusion methods. These girls, as well as those of lesser training, need help in this complex field.

The outstanding transfusion need in hospitals both large and small is not more blood, but safer blood. This problem cannot be solved by individual physicians working independently. A safe transfusion program in rural hospitals requires affiliation with larger urban blood banks and Rh laboratories to which the technologist can go for one or two weeks each year to acquire new and modern techniques by working side by side with technologists devoting full time to transfusion work; to which she can call or write to seek help with special problems, to which she can send specimens for study or confirmation, and to which requests can be made for unusual blood from larger stock. Furthermore, hospital laboratory personnel could in this way be briefed as to the ways in which clerical errors arise which experience has shown account for too many transfusion accidents. Personnel of the larger central blood banks can instruct visiting technologists in the details of actual cases and in methods to prevent this type of accident.

It does happen that more blood, as well as safer blood, is needed. Sudden, unforseeable needs for large amounts of blood of a specific type can develop in any hospital, irrespective of size. A normal obstetrical case may suddenly need many units of blood, or a supposedly normal man may, without warning, develop a profound gastric hemorrhage. The transfusion needs in such emergency situations can best be met by a well organized, reliable local program. Every community can maintain such a program to cover transfusion emergencies, just as it maintains fire and police departments for other emergencies. Such a transfusion program anticipates a sizable reserve of plasma and a well organized actively functioning "walking" blood bank.

Walking blood banks often disintegrate, however, unless there is a local community or county

(Continued on page 347)

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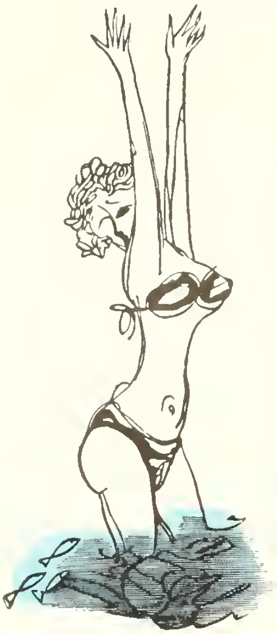

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MORE OR SAFER TRANSFUSIONS

(Continued from page 344)

blood bank which is an integral part of the life of that community. Moreover, the walking blood bank offers no protection if the laboratory technologist does not have the physical equipment, materials, and especially the know-how to draw blood from donors quickly and surely. The daily drawing of blood for routine transfusions is the best assurance that this equipment, materials and experience will be ready when an emergency occurs. Such a local program supplemented and backed up by the further services available through affiliation with a large central community blood bank offers, in our opinion, transfusion security and safety for the rural physicians, hospitals and community better than any we know.

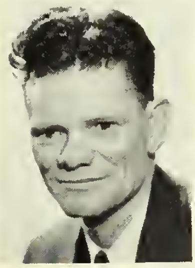
The success of such a cooperative rural transfusion program, adequate to the current and emergency needs of a community depends upon the enthusiastic support and supervision of the local physicians. It is important, of course, in a cooperative program for hospital administrators and other groups in a community to participate in the program, but most of all it is necessary for the physicians to spend time and effort in making safer this important part of their practice.

R. W. Koucky, M.D.
Minneapolis War Memorial Blood Bank, Inc.
Minneapolis, Minnesota

News Briefs . . .

North Dakota

New officers of the North Dakota State Medical Association, elected at the sixty-fifth annual meeting in Fargo, May 10 to 13, include: president, Dr. O. W. Johnson, Rugby; president elect, Dr. James Sorkness, Jamestown; first vice president, Dr. P. H. Woutat, Grand Forks; second vice president, Dr. D. J. Halliday, Kenmare; secretary, Dr. E. H. Boerth, Bismarck, and treasurer, Dr. E. J. Larson, Jamestown.



O. W. JOHNSON, M.D.

New head of the Women's Auxiliary is Mrs. G. G. Thorgrimson, Grand Forks, and president elect, Mrs. L. H. Kermott, Minot.

Dr. Syver Vinje, Hillsboro, who has practiced medicine in North Dakota since 1902, was presented with a certificate and gold pin, and made a member of the Fifty-Year Club of the association. Dr. F. O. Gronvold, Fargo, and Dr. V. J. LaRose, Bismarck, were also made honorary members of the club.

Minot will be the site of the 1953 convention, slated to open the second Saturday in May.

* * *

The North Dakota Diabetes Association, which also met in Fargo at the time of the North Dakota State Association, reports election of the following new officers: president, Dr. A. K. Johnson, Williston; vice president, Dr. R. W. Rogers, Dickinson; secretary, Dr. M. Hoehhauser, Garrison, and executive secretary-treasurer, Dr. A. E. Haunz, Grand Forks.

* * *

Mercy hospital, Williston, will construct a 50-bed addition to the hospital in the near future, it was announced by the hospital board. First contributors to the building fund were Williston doctors, who presented a gift of $25,000.

* * *

NEW LOCATIONS AND APPOINTMENTS

Dr. A. B. Combs, Minot, is moving to Lexington, Kentucky, where he will be associated with the Lexington Clinic as head of the ear, nose and throat department.

Dr. Douglas T. Lindsay, former director of Division of Maternal and Child Hygiene, North Dakota State Department of Health, Bismarck, has moved to Fargo, where he is in charge of orthopedic surgery at the Veterans Hospital. His work as medical director of the North Dakota Crippled Children's Services is being continued on a part time basis.

* * *

Dr. Marshall Landa, a graduate of the University of Minnesota medical school, and former instructor in radiology at the University of Utah, is now associated with the Fargo Clinic.

* * *

Dr. L. C. Ingalls, Minot, has taken a position as chief of surgical services for a new hospital under construction at Rockingham, North Carolina.

* * *

Dr. G. S. Carpenter, who for twenty-three years has been on the staff of the North Dakota State Hospital, Jamestown, is retiring from medical practice and will make his home in Sacramento, California.

Minnesota

Dr. Henry F. Helmholz, chief of pediatrics at the Mayo clinic, Rochester, was named chairman of National PTA Congress standing committee on health at the group's fifty-sixth annual meeting in Indianapolis, Indiana, on May 21.

* * *

Dr. Richard V. Ebert has been named Clark professor of medicine at the University of Minnesota medical school. Dr. Ebert has been chief of medicine at the Minneapolis Veterans Hospital for the past six years.

* * *

Ceremonies for the cornerstone laying for Madison's new $500,000 hospital were held May 11. Speakers included Dr. M. O. Sletten, president of the hospital board and Dr. Magnus Westby, chief of staff of the Madison hospital.

* * *

Dr. Henry E. Michelson has been named by Sir Archibal Gray, president of the Tenth International Congress of Dermatology, to serve as one of the honorary vice-presidents of the congress, which will be held this month in London.

American College Health Association News . . .

Max L. Durfee, M.D., president of the American College Health Association, reports:

"Two excellent section meetings furnish the impetus for this report to the American College Health Association. Attending other than one's own annual section meeting is a rare privilege, for which perhaps only the president can find sufficient excuse. The experience is recommended for all who can find both the time and the opportunity.

"The Ohio Section, my own, met at Wittenberg College in Springfield, Ohio, just one week after the Boston meeting. Wittenberg is demonstrating what may be done in a small college to promote the cause of student health. Interestingly enough the theme of this meeting was quite similar to that of our thirtieth national meeting. By probing "Campus Administrative Relationships" an attempt was made to show how both the college and the health service would benefit by mutual cooperation of all concerned."

"Unfortunately this excellent meeting is remembered with a note of sadness because a week later we received word of the death of Dr. J. Roger Marquardt, the fine practitioner who was rapidly improving the medical program at Wittenberg. Dr. Marquardt will be difficult to replace, but the program there will keep going as it did before, under the guidance of Mrs. Rena Coppess, the nursing supervisor.

"The Michigan Section Meeting, held in the beautiful and functional Kellogg Center for Continuation Study on the campus of Michigan State College at East Lansing, furnished the president an excellent excuse to visit his native state. The agenda for this smoothly-run, one-day meeting was excellent. An outstanding feature of the program was a detailed report of the Boston meeting made by Dr. Irvin Sander of Wayne University, Detroit. The idea is worth recommending to other sections who may wish to create more interest in the American College Health Association among their constituent colleges.

"It was noted with interest that in the Michigan Section all categories of health service workers, nurses, lay administrators, health educators as well as physicians were given offices and other positions of responsibility. The section is to be commended for this practice because it is in keeping with the spirit of the parent organization.

* * *

The program of the two-day meeting of Ohio College Health Association was as follows:

Round Table Discussion: "Health Service Problems from a Student's Viewpoint." Participating were students from Ohio State University, Ohio Wesleyan University, Denison University, and Wittenberg College. Moderator—Russell H. Williams, M.D., Denison University.

Round Table Discussion: "Health Standards for Ohio Colleges." Adam Denison, M.D., and Charles L. Hudson, M.D., Western Reserve University. Participating in the discussion were Florence M. Helman, co-ordinator of health, Kent State University; Samuel Cooper, director of health and physical education, Bowling Green State University; and John N. Stauffer, dean of students, Wittenberg College. Moderator—E. Herndon Hudson, M.D., Ohio University.

Banquet—Springfield Country Club. President Allenbach presiding. Dr. Marquart, toastmaster. Welcome to members of the Association—President Clarence C. Stoughton, Wittenberg College. Speaker—Max L. Durfee, M.D., Oberlin College, President of the American College Health Association.

Round Table Discussion: "Campus Administrative Relationships from the Viewpoint of Deans and Other Campus Personnel Officers." Participating—Mrs. Christine Conaway, Dean of Women, Ohio State University, J. J. Somerville, Dean of Men, Ohio Wesleyan University, Dr. Wendell C. Nystrom, Dean of College, Wittenberg College, Frank G. Lankard, Dean of Baldwin-Wallace College.

HISTORY OF BLOOD TRANSFUSION

(Continued from page 324)

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A DRAINAGE METHOD FOR DUODENAL OR PANCREATIC FISTULAE

(Continued from page 318)

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WHOLE DEFATTED PANCREATIC SUBSTANCE IN THE TREATMENT OF PSORIASIS

(Continued from page 328)

cases covered by this preliminary report, caution must be exercised in their interpretation because of the natural disappearance or improvement of psoriasis lesions in many cases.

The study will be continued and evaluated more fully by comparison with a control series of cases.

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SUBCUTANEOUS INJURIES OF THE LIVER

(Continued from page 327)

The second case illustrates type four in the clinical classification. The patient showed obvious signs of internal hemorrhage with shock. His signs and symptoms cleared up entirely within a few days. The treatment of shock, of course, is of primary importance. The decision as to conservative medical management or early surgical exploration in subcutaneous liver injuries can best be made after adequate treatment of shock.

SUMMARY

In this report a short summary of the recent advances in surgery for diseases and traumatic injuries of the liver is given. Classification and treatment of subcutaneous injuries of the liver is discussed and cases typical of two different types of injuries are presented. Complications following injuries and surgery of the liver are enumerated, and surgical approaches to extrahepatic abscesses and collections of bile or blood are also reviewed.

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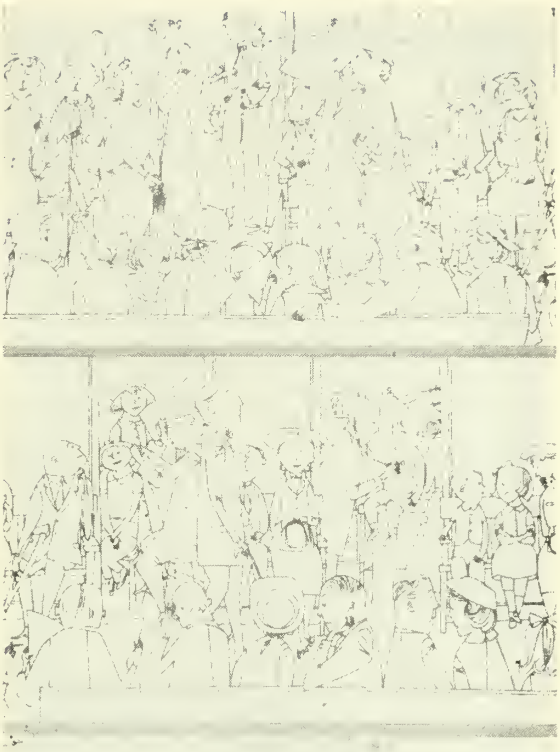
Whenever a new discovery is reported to the scientific world, they say first, "It is probably not true." Thereafter, when the truth of the new proposition has been demonstrated beyond question, they say, "Yes, it may be true, but it is not important." Finally, when sufficient time has elapsed to fully evidence its importance, they say, "Yes, surely it is important, but it is no longer new."—Michael de Montaigne.



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International Congress on Diseases of the Chest, Rio de Janeiro, Brazil, Aug. 24-30. Mr. Murray Kornfeld, 112 East Chestnut St., Chicago 11, Illinois, Executive Secretary.

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International Congress of Neuropathology, Rome, Italy, Sept. 8-13. Dr. Armando Ferraro, 722 W. 168th St., New York, N. Y., U. S. A., Secretary General.

International Union Against Tuberculosis, Rio de Janeiro, Brazil, Aug. 24-27. Prof. Etienne Bernard, 66 Blvd. St. Michel, Paris 6e, France, Secy.-General.

Neuroradiologic Symposium, Stockholm, Sweden, Sept. 17-20. Docent Ake Lindblom, Symposium Neuroradiologicum, Serafimerlasarettet, Stockholm K., Sweden, Secretary.

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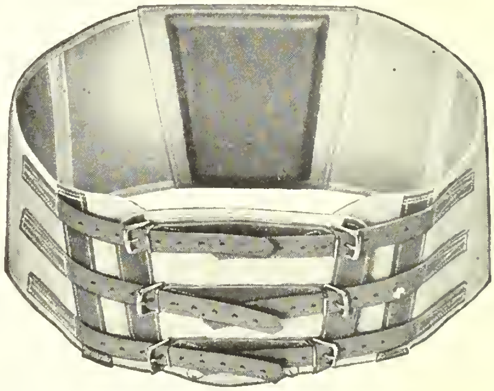

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A Practical Scheme for the Treatment of Urinary Tract Infections*

C. D. CREEVY, M.D.†
Minneapolis, Minnesota

THE TREATMENT of infections of the urinary tract should be guided by several principles: (1) that failure to cure the disease may result in irreparable damage to the urinary organs or to some part of them; (2) that failure to respond promptly to good treatment requires consideration of the possibility of stasis, foreign bodies (particularly stones), abscesses, and of tuberculosis; and (3) that treatment should be continued for some time after the urine has become clear with the object of killing the causative organism rather than of merely inhibiting it sufficiently to get rid of the pyuria; premature abandonment of treatment is responsible for many relapses.

A convenient if unscientific classification of urinary infections has been adopted for the purpose of this discussion: (1) *Mild acute infections.* These make up most of those which the practitioner is called upon to treat. Onset is sudden, with dysuria and pyuria, but the patient is not particularly sick. (2) *Severe acute infections,* characterized by chills, fever, and a variable degree of prostration. (3) *Chronic infections.* These last are of two main types: symptomless pyuria discovered during routine examination of the urine, and chronic pyuria with recurrent or persistent vesical irritation.

The occurrence of an infection of the urinary tract imposes certain requirements for a minimum study of the patient before treatment is begun. The history must aim at disclosing previous attacks, renal pain, antecedent infections of the genitalia (prostatitis, cervicitis), and tuberculosis.

Physical examination should include measurement of the blood pressure in chronic infections, since an occasional hypertension is caused by chronic pyelonephritis; the external urinary meatus should be inspected in both sexes for stenosis, and in the female for caruncle. The urethra should be palpated carefully for thickenings which may represent scarring from strictures, or the bulging of diverticula, pressure on which may expel pus from the external meatus. Skene's glands should not be forgotten. The prostate should be examined for tenderness, swelling, and for the fluctuation of abscesses; stones may occasionally give rise to crepitus. If the patient is afebrile, the prostatic secretion should be expressed gently upon a clean glass slide and examined under a cover slip for pus, since prostatitis may be responsible for a moderate pyuria; more often it is the focus which prevents cure or causes relapses. The total renal function should be checked, both because impaired function demands a careful investigation of its cause, and because it makes the use of mandelic or other acids dangerous, and absolutely contraindicates the use of streptomycin and aerosporin (polymyxin B). A rough idea of the functional capacity of the kidneys is most easily secured by measuring the specific gravity of a morning specimen in the absence of an abnormal fluid intake, or by estimating the one hour excretion of PSP. A specific gravity below 1.020 or a PSP excretion below 50 per cent in one hour suggest further study.

---

*Presented at the Center for Continuation Study of the University of Minnesota in the course on Therapeutics, March 25, 1952.

†Head, division of urology, University of Minnesota Medical School, Minneapolis, Minnesota.

A catheterized specimen should invariably be secured from the female for examination for pus. It is amazing how often pyuria due to the admixture of vaginal secretions with the voided urine is treated with complete futility for long periods under the impression that the pus originates in the urinary tract. It is desirable to make a Gram stain of the fresh centrifuged sediment, or a culture if this is feasible. This may be reserved for resistant cases if desired. In the male the foreskin should be retracted, the glans washed, and the urine voided into two containers. Cloudiness which does not clear upon acidification of both glasses usually means pus from the bladder or higher, while a cloudy first glass with a clear second one points to the urethra as the source of the pus. If the stream is impaired or slow to start, or if urination is difficult, gentle catheterization with a small, soft catheter will exclude stricture and residual urine. This is indeed elementary but important.

The treatment of the simple acute infections will be considered first. We must remember that the cheaper antiseptics and antibiotics still have a fairly wide field of usefulness, especially since the mild infections are not disabling and so do not require treatment which, while effective in relieving the symptoms promptly and making the doctor look good, may deal the patient's pocketbook a nasty blow. On the other hand, if the patient has to make a long trip to reach the doctor, the more expensive agents may be preferred in the beginning. In the absence of such a situation, and in the presence of a mild infection, it is a good plan to start with one of the wide spectrum, inexpensive antiseptics or antibiotics. Worth considering are sulfadiazine 0.5 gram or Gantrisin one to two grams four times daily. If there is no impairment of the renal function and fluids need not be forced, calcium mandelate, three grams four times daily, is worth trying. Fluids are restricted to 1200 cc. in 24 hours, and the drug taken on a full stomach to minimize gastric irritation. I have had no success with Mandelamine nor with such drugs as Pyridium, Serenium, or Caprokol.

Usually, if one of the first three preparations is going to be effective it will be evident within a few days. If no benefit appears within that period, one may switch to another of those preparations or, if time is important, it may be preferable to make a Gram stain of the fresh sediment of the centrifuged urine. For Gram negative rods, one may give Aureomycin or Terramycin 0.25 grams four times daily, preferably with milk. One must remember the danger of diarrhea and of fungus infestations of the mouth and anus from these agents, and discontinue them at the first sign of their development. For patients intolerant to these drugs, Chloromycetin 0.5 gram four times daily may be preferred. It is placed last despite the fact that it causes fewer untoward reactions than Aureo- and Terramycin, because the larger dose required runs up the cost.

For Gram positive organisms (except streptococcus fecalis) penicillin is preferred when the sulfonamides and mandelic acid fail, but only if the infection is a fairly serious one, because of the necessity for injection to secure dependable results. Probably the most convenient effective method of parenteral administration consists of Penicillin G Crystalline in saline, 500,000 units intramuscularly twice daily. This produces higher peaks and lower valleys in the level of penicillin in the blood than does the use of the slowly absorbed preparations, but causes fewer local reactions at the site of injection. Penicillin O may be used in patients sensitive to G.

If the methods thus far outlined yield prompt relief, it is well to continue the agent which was successful in gradually diminishing doses for a week or two longer in the absence of any ill effects in an effort to make sure that the benefits were not due merely to inhibition of growth of the organisms, and to make as sure as possible of killing them. For this continued treatment, penicillin should be replaced by an agent which does not have to be injected. If use of these methods is unsuccessful after ten to fourteen days, one should employ the regimen to be outlined in connection with chronic infections.

In an occasional mild acute infection one will be unable to find any organisms in the urinary sediment. This raises the question of amicrobic pyuria and the development of a tuberculous cystitis. The sediment of a twenty-four-hour urine specimen should be subjected to the Ziehl-Nielsen stain. If no acid fast bacilli are found, one should send a urine collected with sterile precautions to the State Board of Health for culture for tubercle bacilli. In the meantime, it is worthwhile to try the effect of 0.15 gram of Neoarsphenamine intravenously on alternate days for five or six doses. If success is to be expected (as it is in amicrobic pyuria) it will be apparent within a couple of days. Failure requires a complete investigation of the urinary tract as in the case of chronic infections.

Severe acute infections are in a different category. A sterile (catheterized) specimen of urine should be secured at once for culture, Gram stain of the sediment, and sensitivity tests. Pending the results of these tests, one should load the patient with one of the broad spectrum antibiotics such as Aureomycin, Terramycin, or Chloromycetin, giving one gram of either of the first two, or two to three grams of the third as the initial dose, and then continuing with 0.5 gram every four to six hours until improvement is apparent. The dosage may then be reduced to 0.25 gram every four hours. If the patient cannot take oral medication, Aureo- or Terramycin may be given intravenously in half gram doses once in twelve hours. If the condition appears dangerous, one may add a hundred thousand or more units of penicillin every three hours (intramuscularly). There is some question whether penicillin may antagonize Aureomycin and Terramycin in some circumstances, but this has not been proved. Failure to respond within twenty-four hours to this regimen should lead to replacement of the original antibiotics with others if the sensitivity test suggests it. Otherwise the whole urinary tract should be carefully searched for evidence of stasis and abscesses. Inasmuch as this investigation is identical with that required in chronic infections, both will be described together.

INVESTIGATION OF THE URINARY TRACT

The residual urine is checked after the patient has voided from a reasonably full bladder with a clear understanding on his part that the emptying of his bladder is being investigated, so that the test will be accurate. The specimen thus secured may be used for cultures and sensitivity tests if these have not already been done. While the presence of 50 cc. or more of residual urine demands cystoscopy if the cause is not obvious, this should be deferred until the x-ray studies have been completed. If residual urine is found in the presence of a severe acute infection, an inlying catheter may be used while other studies are being made, both to drain the bladder and to determine its effect upon the course of the disease.

The next step is a *good* x-ray of the urinary tract (KUB). A cathartic such as milk of magnesia (two ounces) should be given late the night before the x-ray, and fluids should be withheld until after the x-ray has been made. In the absence of serious illness, severe hypertension or coronary disease, one cubic centimeter of Pitressin should be given 45 minutes before the roentgenogram, and the patient should then be sent to the toilet to get rid of his gas. The technique of exposure varies so much with different equipment and developers that it will not be described. The KUB is of value chiefly in demonstrating stones, enlarged or shrunken renal shadows, and the scoliosis and blurring of the lateral margin of the psoas muscle seen with perinephritic abscesses. If the preparation of the patient is seen to be poor (gas, feces) one should try an enema and more Pitressin before making more x-rays.

As a rule, the KUB must be supplemented by an excretory urogram if the urinary tract is to be studied with any accuracy. Compression is applied to the lower abdomen between the anterior superior spines with a roll of cloth held down to the point of real discomfort by the compression band of the x-ray table. Properly applied compression makes the difference between good and indifferent urograms. It serves both to cause stasis in the ureters, thus outlining the collecting system far more clearly, and to displace the bowel with its contained gas to one side. It is not uncommon to see slight dilatation of the ureters and renal pelves disappear after removal of the compression. Our best urograms up to the present have followed the injection of 35 cc. of 70 per cent Urokon. Films are usually exposed ten, twenty, and forty-five minutes after injection, but the time is varied after inspection of the first film, since impaired function of the kidneys may demand continuation of follow-up films for as long as two hours or even more after the injection. To expose all the films in the series before inspection of the first one is wasteful, since it permits no correction of errors in technique nor allowances for variations in the rate of excretion of the agent. Returns from excretory urography are in direct proportion to the pains expended in making them. The shadow of the bladder in the urogram is of very limited value unless the last film is exposed after the bladder feels full to the patient, since many apparent distortions of the vesical outline are due to incomplete filling.

In the urogram one looks for hydronephrosis, swelling of the parenchyma and consequent narrowing of the calices due to severe pyelonephritis; absent calices compressed by abscesses; the ragged cavities of tuberculosis; filling defects in the collecting system due to transparent stones; deformities of renal neoplasms which occasionally announce their presence by fever from necrosis, and pyuria; ureteral dilatation due to stones, neoplasms, and congenital anomalies such as stricture and ureterocele; the filling defects in the bladder resulting from transparent stones and tumors; and for diverticula and the trabeculation due to obstruction at the vesical neck. Every x-ray of the urinary tract with contrast agents *must* be preceded by a KUB lest the contrast agent conceal stones from view.

When the urogram is unsatisfactory, one must resort to cystoscopy. This should invariably be done with an instrument which permits inspection of the urethra as well as the bladder, since many a "cystitis" in the female is due to an inflammation of the urethra which is productive in character; the resultant fronds of inflammatory tissue must be destroyed with strong silver nitrate or by electrocoagulation if the symptoms are to be relieved permanently. Similarly in the male, an infection in the urinary tract may prove to be a prostatitis which will persist until mechanical measures, such as massage and dilatation, are employed in addition to antibiotics. Cystoscopy will also disclose small lesions which do not produce deformities recognizable in the cystogram. Lastly, the source of the pus may be found in the catheterized specimens from the kidneys, and retrograde pyelograms may be made to supplement unsatisfactory urograms.

The purpose of the whole investigation is, of course, to find out why the infection has become chronic and resisted treatment. After the cause has been found and rectified, the antibiotics will again be needed to eliminate infection. It is better to investigate resistant infections *before* all the antibiotics have been used and bacterial resistance thus raised to a maximum.

RESISTANT CHRONIC INFECTIONS

It is in cleaning up the residual infections that the sensitivity tests and the various combinations of antibiotics as well as cultures are of most value. No fancy laboratory is needed for sensitivity tests carried out with the Difco filter paper discs and nutrient agar in Petri dishes from the same source, provided one has a small electric autoclave and incubator.

One can make few recommendations for the use of specific antibiotics alone or in combination to eliminate particular strains of organisms. Aside from following the dictates of the sensitivity tests, one may say that the most resistant of the organisms ordinarily found in the urinary tract are the Pseudomonas aeruginosa (Pyocyaneus), B. proteus, and Aerobacter aerogenes, in descending order.

Pseudomonas aeruginosa will sometimes respond to larger than average doses of Aureomycin or Terramycin, or even to calcium mandelate or Gantrisin, but most strains will survive. Aerosporin (Polymyxin B) is said to be almost specific for this organism, but its nephro- and neurotoxic effects make it necessary to refrain from using it except in rare fulminating infections of the urinary tract or in septicemia.

For B. proteus probably the most effective combination thus far tried consists of Chloromycetin* 0.5 and Gantrisin 2.0 grams four times daily for a week. During the second week the dose is halved; during the third week it is again halved. If this combination fails, one may try 125,000 units of penicillin and 0.25 gram of streptomycin intramuscularly every three hours for several days. Long continued administration of this mixture is avoided because of the possible effects of the Streptomycin upon the vestibular apparatus, and because of possible nephrotoxic manifestations if the renal function is much impaired. Dihydrostreptomycin carries the same dangers except that the auditory rather than the vestibular apparatus is threatened.

Aerobacter aerogenes will ordinarily respond to good sized doses of Aureomycin or Terramycin, but a few strains will require a good deal of experimentation with various agents and combinations before success is achieved. Let me reemphasize at this point the importance of continuing the administration of the apparently effective regimen for some time after the urine has cleared.

An occasional patient will suffer from repeated flareups after apparently successful sterilization of the urine, and with little or no evident underlying cause in the way of stasis, foreign bodies, etc. Such patients will sometimes be able to keep the urine clear and sterile for indefinite periods on almost homeopathic doses of an antibiotic. The drug which eliminated the infection originally may be used in gradually descending doses until the minimum amount required to prevent both symptoms and pyuria is found. One must, of course, watch for toxic effects from the protracted use even of small doses. One such

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*Recent reports of fatal granulocytopenia following the use of this drug dictate avoidance of prolonged administration of large doses.

(Continued on page 388)

Medullary Nailing of Femoral Shaft Fractures

GEORGE M. HART, M.D.*
Minot, North Dakota

THE PRINCIPLE of intramedullary fixation of fractures of long bones was presented to the medical profession by Küntscher on Easter of 1940 at the 64th Congress of the Deutsche Gesellschaft für Chirurgie. Although this method had previously been practiced, the recognition of the method and the increasing acceptance of it as the treatment of choice in suitable fractures arose from his work and interest in the subject. Böhler, in Küntscher's audience, was intrigued by the procedure and shortly thereafter adopted its use on his patients at the Accident Hospital in Vienna. In 1944-45, he reported in his book on medullary nailing the results obtained in 268 cases.

During World War II, medullary nailing of long bone fractures was practiced extensively by German surgeons. A number of German prisoners of war whose fractures had been treated in this manner were observed by American army physicians who admired the apparent excellent results but speculated as to the effect of the nail on hemopoiesis. However, patients apparently did not suffer in this respect from its use.

In 1947, the Department of the Army authorized a grant through the National Research Council for clinical investigation of intramedullary fixation of femurs. Shortly thereafter the Committee on Fractures of the American Academy of Orthopedic Surgeons adopted medullary fixation as a project, and at the 1951 Academy meeting, findings were reviewed by the participants in the project.

INDICATIONS FOR INTRAMEDULLARY NAILING OF FEMORAL SHAFT FRACTURES

Early in the practice of the intramedullary nailing method only simple transverse or short oblique fractures in the mid-third of the femoral shaft were considered suitable for intramedullary fixation. However, as experience was gained, certain other femoral shaft fractures were found in which the method was successful. Comminuted fractures, at first thought to be not adaptable to this fixation method, were successfully treated by intramedullary nailing supplemented by additional internal support with steel wire or screws. Fractures at two or more levels were successfully managed by threading the several pieces along the nail like beads on a string. Certain fractures in the proximal one-third of the femur, particularly in the subtrochanteric region, were immobilized securely enough by the nail to obtain healing. Fractures of the lower third of the femur where the medullary canal is wider were found to be less adaptable as less secure fixation was obtained.

Certain cases of malunion, delayed union and non-union responded exceedingly well. Usually, medullary fixation was supplemented in these cases by use of an iliac bone graft placed at the fracture site.

The method has also been found applicable for certain pathologic fractures of the femoral shaft, particularly lesions caused by such conditions as metastatic carcinoma and bone cysts.

Patients with severe coexisting injuries such as paraplegia or extensive burns have been treated by intramedullary nailing. The greater ease in handling such cases after the femoral fracture has been secured has greatly simplified nursing care.

ADVANTAGES OF INTRAMEDULLARY FIXATION

Fragments fixed by intramedullary nails are accurately reduced. The fracture is held in end to end apposition, and alignment is assured. Fixation is solid, and diastasis does not occur as it may with plate and screw fixation. The fragments are free to slide on the nail so that close apposition is maintained during healing despite absorption that may occur at the fracture site.

Since no cast is required, muscles and joints are free to function during the healing period rather than remain inactive developing the atrophy of disuse. This is of particular advantage to the knee joint which frequently is painful and stiff following prolonged plaster immobilization.

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*Section on orthopedic surgery, Northwest Clinic, Minot, North Dakota.

Patients treated by this method become ambulatory in a relatively short period of time, usually within two or three weeks following operation. In contradistinction, patients with plated femoral shaft fractures are rarely ambulatory until four months after operation, and frequently immobilization must be prolonged for six months or more. Because of this, hospitalization is considerably reduced providing a definite economic advantage to the patient. Those whose work is not of a strenuous nature have frequently been able to return to their occupations within a month after fixation of a fractured femur.

TIME FOR INTRAMEDULLARY NAILING

Fresh, simple fractures of the femoral shaft can be nailed as soon as shock is under control. If extensive swelling or tension blebs are present on the skin, the patient is treated in traction for a period of ten to twelve days until the swelling subsides and the skin is healed.

Compound fractures, in general, should be treated by methods other than intramedullary fixation. However, some of the less severely compounded injuries are suitable for nailing one to several weeks following injury providing the compounded wound has healed primarily.

POSTOPERATIVE CARE

Following insertion of the nail, a pressure dressing is applied to the extremity extending from the toes to the upper thigh. Postoperative hematoma and swelling are minimized in this manner. The extremity is elevated either in balanced suspension using a Thomas splint with a Pierson attachment or by pillows. No traction is used which might tend to distract the fragments. Antibiotics are administered as the surgeon desires.

As postoperative pain and swelling subside, quadriceps setting, straight leg raising and active motion of the hip, knee, and ankle are begun. Usually the former is started within two to three days following surgery. Depending upon the stability of the fracture as demonstrated during operation, the patient is allowed up on crutches. Most patients become ambulatory two weeks after operation when the sutures are removed from the wounds. The patient is instructed to touch the foot of the affected extremity to the floor in walking so that mild compression of the fracture ends is produced. He is particularly warned not to carry the extremity suspended, as gravity then tends to distract the fracture.

During the following three months, weight bearing is gradually resumed as callus formation determined by periodic x-ray examination occurs. Crutches are usually continued at least three to four months postoperatively or until good callus formation is demonstrated.

When the fracture has healed completely and the fracture line is obliterated as determined by x-ray examination, a small incision is made over the greater trochanter and the nail is withdrawn. Usually this is at least one year following operation.

CASE REPORTS

The following patients with femoral shaft fractures treated by intramedullary fixation are illustrative of the foregoing discussion.

Case 1. D. F., a 13 year old boy, was admitted to Trinity Hospital March 15, 1951, with a simple fracture of the right femur at the junction of the middle and upper thirds incurred five days previously when he jumped from a hay shed wall landing heavily on his right leg.

Examination revealed a somewhat obese boy with a markedly swollen right thigh covered with numerous skin blebs. X-rays revealed a transverse fracture of the upper shaft of the femur with some over-riding of the fragments. The blood pressure was 160/108. The red blood count was 4,200,000, and the hemoglobin was 12 grams. During hospitalization a slight elevation of blood pressure persisted, but medical and laboratory investigation revealed no evidence of cardiovascular or renal disease.

Eight days after admission to the hospital the skin blebs had healed, and the boy was taken to the operating room where the fracture was secured by intramedullary fixation using a cloverleaf Küntscher nail measuring 8 mm. by 30 cm. Open technique was used, passing a guide pin cephalad through the proximal fragment over which the nail was introduced from above downward to cross the fracture site. Pentothal Sodium supplemented by nitrous oxide and oxygen anesthesia was used, and 1.5 cc. of curare were administered during the procedure to facilitate relaxation and reduction of the fracture fragments. One thousand cubic centimeters of blood were given during and immediately after surgery.

Following introduction of the nail the limb was suspended in balanced traction for a period of two weeks. The postoperative course was uneventful with the exception of a transient peroneal nerve palsy which occurred four days postoperatively. This was due to pressure of the supporting stockinette on the Thomas splint at the knee and disappeared after the splint was adjusted. Quadriceps exercise and active motion of the knee and ankle were begun one week after surgery when the postoperative reaction had subsided. The following week he became ambulatory in a walker and was discharged from the hospital on crutches April 18, 1951, one month after admission.

He was next seen at the clinic May 11, 1951, seven weeks after surgery. At that time he was walking without crutches, although he had been instructed to continue using them. The previous week, he had played baseball. His only complaint was of some stiffness in the right knee.

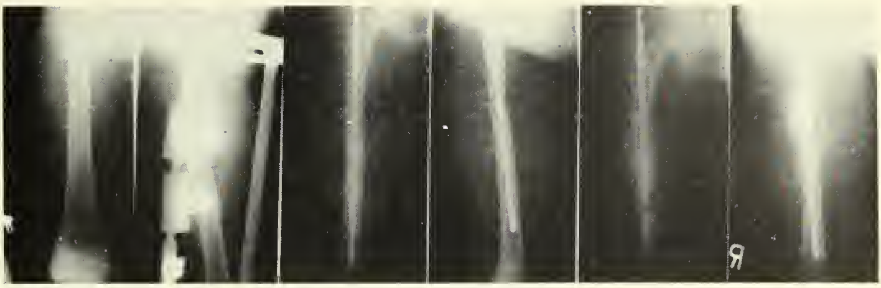

Fig. 1. Transverse fracture of femoral shaft in 8 year old boy treated by intramedullary nail. X-rays at right seven weeks after operation.

Examination revealed active motion of the knee from 180 to 70 degrees. It was noted that he walked with a slight right hip limp. Measurements from the anterior superior iliac spine to the medial malleolus were 30 inches bilaterally.

Anteroposterior and lateral x-rays were made of the femur and revealed satisfactory progress of healing of the fracture with good callus formation. The boy was instructed in abduction hip exercises and advised to refrain from active sports.

He was next seen July 13, 1951, and had not used his crutches since the previous visit. He had no complaints, and examination revealed motion of the hip, knee and ankle to be normal. X-rays revealed abundant callus formation at the fracture site. The parents were informed that the nail would be removed after complete healing of the fracture had taken place.

Case 2. Mrs. K. J. S., a 24 year old woman, was admitted to Trinity Hospital August 6, 1951, following a motorcycle accident in which she sustained a fracture of the right femur. She was three and a half months pregnant. Examination revealed angulation and crepitus of the mid-third of the right thigh with two inches actual shortening. The blood pressure was 136/70. Laboratory examination revealed a red blood count of 4,130,000 and a hemoglobin of 10.6 grams. Ten milligrams of albumen were present in the urine.

X-rays of the right femur demonstrated a transverse fracture in the mid-third with over-riding of the fragments. On August 11, the fracture was exposed through an anterolateral incision, and a cloverleaf Küntscher femoral nail was inserted across the fracture site. Spinal anesthesia was used, and 500 cc. of whole blood were administered during the procedure.

She made an uneventful postoperative recovery. Quadriceps exercises were begun four days after surgery and ambulation on crutches ten days later. X-rays made on August 30, 1951, revealed satisfactory position of the fragments. The patient was discharged from the hospital September 2, 1951, to return to her home in Canada. She was advised to remain on crutches for a period of four months.

Case 3. D. S., an 8 year old boy, was injured August 13, 1951, when he jumped from the side of a moving pickup truck sustaining a fracture of the right femur. He was admitted to Trinity Hospital where examination revealed swelling and angulation of the thigh. X-rays were made demonstrating a transverse fracture of the shaft of the femur at the junction of the upper and middle thirds (figure 1). The blood pressure was 116/54.

Laboratory examination revealed a red blood count of 4,200,000 and a hemoglobin of 11.6 grams. Urinalysis was negative.

On August 17, under general anesthesia, the fracture site was exposed, and an intramedullary cloverleaf Küntscher nail was introduced. During the procedure 2 cc. of curare and 500 cc. of whole blood were administered.

The postoperative period was uneventful. Ambulation in the walker began on the fourth of September, and he was discharged from the hospital on crutches four days later.

He was seen in the office October 6, 1951, at which time he continued to use crutches. The only complaint was of some soreness in the region of the greater trochanter. X-rays demonstrated abundant callus at the fracture site. He was advised to resume weight bearing gradually on the injured leg.

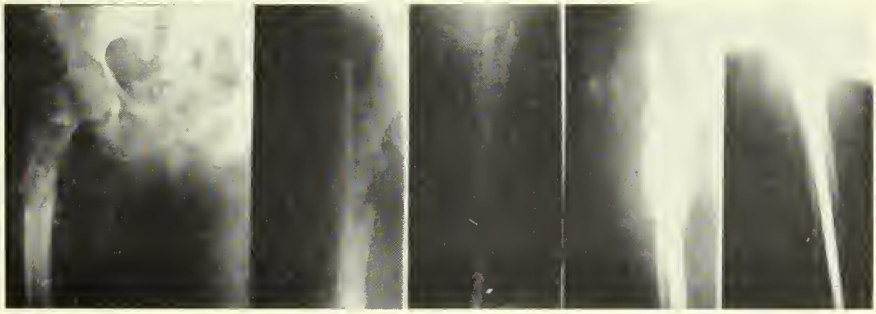

Fig. 2. Pathologic subtrochanteric fracture of femur in 73 year old woman. X-rays 5 months after insertion of nail reveal fracture to be healed.

Case 4. Mrs. D. F. B., a 73 year old woman, was admitted to Trinity Hospital December 8, 1949, with a complaint of severe pain in the right hip and upper thigh. About 9:30 that morning she had tripped and fallen injuring her right hip. Following the injury she was unable to walk. In April of that same year she had a similar fall, also followed by pain in the upper right thigh. Shortly after this injury she found it necessary to use a cane but managed to remain ambulatory. The pain in the hip was relieved by rest but never completely disappeared. Two years previous to admission

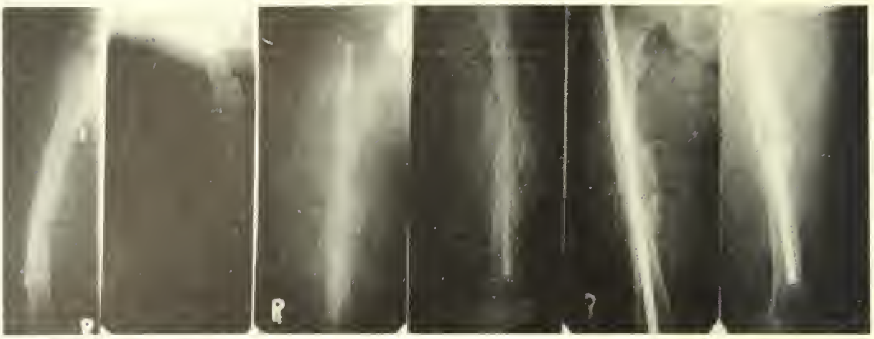

Fig. 3. Non-union is present in comminuted femoral shaft fracture six months after plate and screw fixation. X-rays in center show position of nail and iliac grafts immediately postoperative. Films on the right show callus formation one month later.

to the hospital, a radical amputation of the left breast had been done for a scirrhous adenocarcinoma.

Examination revealed a moderately obese woman in acute distress due to pain in the right hip region. The right lower extremity measured 2 cm. less than the left and was externally rotated. There was marked tenderness over the upper third of the femur. The blood pressure was 170/98.

X-rays revealed a pathologic subtrochanteric fracture of the right femur (figure 2). A film of the chest and a survey of the entire skeleton revealed no further metastases.

The red blood count was 4,530,000 and the hemoglobin was 13.1 grams. Urinalysis was negative.

On December 9, 1949, a lateral incision was made over the proximal third of the femur exposing the fracture site. A biopsy of the tumor tissue was obtained which histologically revealed bone marrow extensively infiltrated with masses of small cuboidal cells with hyperchromatic nuclei of varying size and many mitotic figures. An intramedullary pin was introduced and passed distally across the fracture site. Spinal anesthesia was used, and the patient was given 500 cc. of blood during the operation.

She had an uneventful postoperative course. Quadriceps exercises were started three days after surgery, and six days postoperatively she was up in a wheelchair. Two weeks after operation the sutures were removed from the wound which was healed. On November 28 she became ambulatory on crutches and was discharged from the hospital.

She was next seen in the office February 7, 1950, at which time x-rays revealed evidence of healing of the fracture and callus formation. She was advised to begin partial weight bearing.

By May 1, 1950, she was bearing about 50 per cent of her weight on the extremity. X-rays at that time revealed additional callus to be present.

She was next seen October 30, 1950, and was walking with the aid of one crutch. She complained of occasional mild pain in the upper right thigh. Motion in the hip was from 90 to 180 degrees. Abduction was slightly limited, but rotations were normal. Measurements from the anterior superior iliac spine to the medial malleolus were 32¼ inches on the right and 33 inches on the left. No mass was palpable at the fracture site. X-rays were advised, but the patient refused them.

She was last seen at the clinic September 20, 1951, and still complained of pain in the right hip region relieved by aspirin. She was using one crutch on which she remained ambulatory.

Case 5. Mrs. W. S., age 19, injured in an automobile accident April 21, 1951, sustained a comminuted fracture of the mid-third of the right femur and fractures of both ankles.

Three days following injury, open reductions were performed on the femur and the left ankle. Fixation of the femur was with a metal plate and screws. Immobilization in a double hip spica cast was continued for six months. X-rays at that time revealed no evidence of healing of the fracture (figure 3). The cast was removed, and intramedullary nail fixation supplemented by an iliac bone graft was carried out.

The patient was allowed to become ambulatory on crutches two weeks after introduction of the nail. X-rays one month postoperatively revealed callus to be present at the fracture site. Although not advised to do so, she was walking without use of the crutches indoors.

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Nothing but a cloud of elements organic
C, O, H, N, Ferru, Chlor., Flu., Sil, Potassa.,
Calc., Sod., Phosph., Mag., Sulphur, Mang.,
Alum., Cuprum,
Such as man is made of.

Oliver Wendell Holmes

Observations and Therapy of Peptic Ulcer in Young Adults*

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Over the past several years, we have had the opportunity of following a number of young adults in whom there was an active peptic ulcer. In an average University population of about 20,000 with a ratio of 2 to 1 in favor of males, the average number of peptic ulcer patients seen per year was 39. In addition the average number of individuals with an hyper-active gastro-intestinal tract, but with no evidence of active lesions was 98. No effort was made to determine the percentage of peptic ulcer in the student population, primarily because a peptic lesion is well known for being overlooked as "indigestion." However, of those individuals examined who complained of peptic type distress about 1 in 3 had an active lesion demonstrable by x-ray.

We have had the opportunity of following 83 over a period of time, in which 81 were duodenal in nature and 2 were gastric. Of these 83, 78 were males, 5 were females. Fourteen had a family history of proven ulcer. The average age was 25.8 years and the median age 27—the oldest being 35, and the youngest 16. This is drawn from an age range of about 14 to 40, which includes the University High School through graduate school. The greatest predominance of students are in the age group 17 to 27, however. Of these individuals, 53 were married and 30 were unmarried. In addition 57 had seen service during World War II, whereas 26 had not. Of the 53 who were married, 35 had children, and 18 had none. Also of these 53, 41 lived in what we term the University Village, consisting of quonset huts and trailers. The others lived in apartments and the like. Because of the fact that a great number were in what we have called the compulsive type of field, that is the professional, such as medicine, dentistry, or technology, or the graduate school, an effort was made to determine the proportion. Interestingly enough, of the 83 individuals, 45 were in professional schools, and 13 were in graduate school. The remaining 25 were in undergraduate school. All of this occurred in the presence of the fact that the academic registration is several times the professional registration. In breaking down the professional field we found that medicine, dentistry, technology, and law, in that order had the greatest number of students with lesions.

Of the individuals who had proven ulcer, 55 had smoked; and with two exceptions, a pack a day or more was the rule. Twenty-eight did not smoke. Fifty-eight would drink alcoholic beverages, and 25 did not. Of those drinking alcoholic beverages, about 40 per cent were restricted to beer, which proved a marked irritant to them. Insofar as the weight was concerned, 15 were overweight, 20 were underweight, 48 were of normal weight. Interestingly enough, 34 followed a relatively good diet from the standpoint of standards, whereas 49 concentrated on such things as highly seasoned foods, irregularity, and so on. Of the 83 individuals, 65 were working while going to school, 26 carried out extracurricular activities of some nature, such as being councilman in the University Village group. Symptomatically, 70 had pain and 45 had symptoms of gaseousness. This, of course, shows an overlap in which some had more than one symptom.

There were 7 in whom there was bleeding; none perforated. Three of the individuals came to surgery, two of them because of bleeding even in the light of active medical therapy. One was operated upon because he did not wish to follow a regime at all, and therefore was completely uncooperative medically. Twelve of the individuals did go to Mental Hygiene, with considerable insight being gained but with no remarkable change in their physical status even when they recognized their tension factors.

Thus, the average peptic ulcer lesion as seen the past four years at the University of Minnesota, was a male who was beyond the usual school age, who had seen service, who was married, had one child, was in a professional school, and was working while going to school. Interestingly enough, although we were unable to get a complete breakdown on the hyperactive gastrointestinal tract group, their symptoms were markedly analogous to those of the active peptic lesion, and they, too, followed the same categories of being in a compulsive field, of being married, and of having seen service. Checking with these individuals, it was determined that the regularity so desirable in the treatment of the person with peptic lesion was difficult to obtain in view of the fact that the patients were married, living in cramped quarters with children, carrying a heavy load curricularly, and providing financial maintenance. Thus, rather than treating the individuals with but one approach, a combination regime was instituted. Testing gastric contents for acid was not done routinely; we rather relied upon symptomatic findings together with radiological findings.

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To begin with, our diet, except in those individuals who were bleeding and required hospitalization, was not so restrictive to the patient, as has been stressed in the past, but rather was what we termed liberal bland diet. This approach stemmed from the fact that one of the persons whom we saw first had a diagnosis made earlier and had been placed on a restricted bland diet which he had followed over a period of four years. An x-ray revealed an active peptic lesion. The person was emotionally overwrought as a result of having followed the diet religiously. The only therapy given him was to liberalize the diet. As a result the tension factor lessened considerably and the lesion healed within two weeks. It was recognized that lesions will heal of their own accord, but the dramatic, subjective and emotional response of the patient led us to believe that adhering to a markedly strict regime in those individuals who had no complications was a detriment rather than an asset.

Our first approach was to discuss with the patient the mechanism of peptic ulcer from the standpoint of the usual digestive procedure, together with the hyperstimulation reflected by those who have ulcers. A discussion of his present dietary intake, together with what is ideal was instituted, and he was referred to the dietitian for further instruction and training. We are fortunate in having a diet table available at the University of Minnesota for such persons, and if there is some difficulty in training the patient he is placed on the diet table. Since so many of them were married, as previously indicated, the wives were invited to come along with the patient to share the discussion on diet. This was true also of those who were not married, but whose parents were at hand. It was noted that there was little response in this direction as contrasted with the married patients.

Some of the practical hints which were given the patient were the usual bland approach in having no fried nor fatty foods, no rough foods such as corn or raw apples, no foods that are extremely hot nor extremely cold, no beverages which are carbonated nor alcoholic in nature. In place of this the patient was asked to concentrate on cooked vegetables, such as carrots, lean and tender meats, such as chicken and beefsteak, canned fruits and the usual typical bland foods, such as milk and baked potato. Fruit juice is permitted, but not on an empty stomach. Coffee is permitted after a meal if it causes no difficulty, but it is not recommended. The patient is told not to smoke on an empty stomach. There were some individuals in whom results of having taken away opportunity to smoke had caused far more emotional upset with resultant furthering of symptoms. Thus we felt it was adequate to let them smoke a cigarette after meals. Although not recommended in all instances, it is felt that the stimulation of the gastric juices after having eaten should cause little difficulty, for there is food upon which the juices may work, whereas on an empty stomach the usual process of erosion would continue.

It was also pointed out that episodes will recur sporadically, at which time the diet should be adhered to, but then when there is no marked difficulty it may be elaborated upon. The patient's approach to life is lightened considerably, for he does not appreciate what appears to be a restriction for the rest of his life. In addition to the types of food which are suggested, patients are asked, depending upon their weight, to take calories from their regular meals and have them between meals making six feedings per day instead of the usual three. Thus he may have a glass of milk in mid-morning, mid-afternoon and upon retiring. However, if this is going to add to his weight, correct caloric intake is also important, together with blandness and regularity of the diet. The patient is also asked to carry anti-acids in his pocket during the period of difficulty. We have used several and find that from the standpoint of expense, convenience and results the aluminum hydroxide type of tablet is the most efficacious. However, determination of the type of anti-acid which brings subjective relief and causes the least undesirable taste is an individual matter. In carrying these, the patient is told to have something to eat, or to take two to four anti-acid tablets between meals and at bedtime. In other words, he is instructed to have something in his stomach at all times upon which his gastric juices may work, particularly those which will neutralize. We suggest milk between meals or the anti-acid as a substitute.

Lastly, the patient is placed on antispasmodics, of which there are numerous and sundry, from the old tincture of belladonna to the present Banthine. We have tried all which have been available to us and find that here, too, the results are an individual matter. In the group of 83 which we have followed over a period of four years, initially we noted that Pavatrine with phenobarbital was the most efficacious. The best results were obtained when it was taken about a half hour before meals and at bedtime. One tablet was generally enough, but in some instances two tablets were necessary. It was also noted that other antispasmodics were more efficacious with a quarter-grain phenobarbital than plain Pavatrine without phenobarbital. Thus the combination of the antispasmodic and the barbiturate seemed most ideal. Then in 1950 we were given Banthine to use and found that from the standpoint of efficacy in spasm, Banthine was even better than Pavatrine. In only one instance was it necessary to add a quarter-grain of phenobarbital to the Banthine regime to get adequate symptomatic results. During the period of the active lesion it was found that 100 mg. of Banthine before each meal and at bedtime were the ideal dosage. After relief had been gained this was cut in half to 50 mg. before each meal but with 100 mg. at bedtime.

In checking the apparent efficacy of these medications, gastrointestinal x-rays were done before the routine and about six weeks after the routine had been started. We did not do gastric analysis because of the associated emotional trauma and we were not looking for the neutralization factor but rather the healing factor. Of the 83 cases followed, 34 were within the last two years or during the Banthine regime. Of these 34, 25 were fully cooperative in obtaining serial x-rays, and of the 25, 18 had ideal results on the Banthine, anti-acid, diet regime (five of these had had intractable pain on the previous routines). Three felt that there was no further improvement, and one of these bled even in the face of a full medical regime. Three felt that they received more benefits from Pavatrine with the barbital, and one felt that for him Novatrin with phenobarital was the most efficient. We had kept 10 patients on a persistent prophylactic Banthine regime of 50 mg. four times a day, and of these, seven have had recurrent distress in spite of the therapy. However, this is less than usual, and the active lesion has been demonstrated in but two. In addition, the increasing of the Banthine to 100 mg. four times a day, plus a more adequate following of the diet, has brought about early relief, often within 48 hours. In this vein it may be stated that many students were well controlled until a period of stress, such as final examinations, financial problems, or the threat of service recall, presented itself. Also it was suggested that those persons who could take time off when the pressure of studies became great, to tire themselves physically found considerable relief without medication and had less difficulty over the period of an entire year. This was a subjective piece of information but was volunteered by eight of the persons followed.

Thus of the 83 peptic ulcer patients followed over a period of four years, all were maintained medically except three. Of these eighty, ten were only moderately successful until the advent of Banthine. The remaining seventy received adequate relief on the education, dietary, and medical regime described. In addition it was proven radiologically and symptomatically that possibility of regression is real.

There have been eight instances in which those who have been graduated have notified me of the regression of activity after having become established as producers in an adequate environment. These were all family men who were late in school as a result of service time and who, at our advice, sought positions to fit their personalities rather than to fill a bank account. They reported x-ray results and subjective information. In four of them no residual deformity remains.

SUMMARY

A summary of proven peptic ulcers in a student population of 20,000 is presented. An analysis of the psychic and chemical factors contributing to peptic ulcer is discussed. The types of therapy undertaken in the control of peptic ulcer in the young adult is evaluated and the education of patients is encouraged.

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(Continued on page 388)

Diagnostic Criteria for Coronary Arteriosclerotic Heart Disease

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This disease has numerous manifestations, exacerbations and remissions, and sometimes most unusual features. The data upon which a diagnosis is based may be divided into the following categories: (1) symptomatology, (2) physical findings, (3) electrocardiography, (4) teleoroentgenography, and (5) in some cases it is necessary to exclude other diseases (differential diagnosis).

SYMPTOMATOLOGY

This is, in general, the most important single basis for diagnosis. In the great majority of patients complaints are so typical as to lead directly to the conclusion that coronary arteriosclerotic heart disease is present. In others a careful history reveals symptoms which the patient does not consider bothersome but which have characteristics of great significance. Depending upon the symptoms, five main syndromes may be described. The order in which they are placed parallels the severity of the disease. These are:

1. Angina pectoris, exertional type:

a. Typical syndrome: Substernal pain described as a pressure or weight beneath the mid- or lower sternum. Sometimes the anterior thoracic wall or even the entire chest feels compressed. Very commonly it radiates to the left shoulder, down the medial side of the left arm, often into the forearm and into the small and ring fingers. Dyspnea may or may not occur. It is precipitated by exertion, such as walking briskly, walking against the wind or up an incline, etc. Many times emotional disturbances produce attacks. Emotion plus exertion is the most frequent and most potent of all stimuli. Exacerbations and remissions as to frequency and intensity of episodes often are dependent upon the emotional state of the patient. A heavy meal alone or especially when followed by exertion results in an attack. Duration is from a few minutes to one-half hour, with symptoms becoming progressively worse if the exciting cause is continued. The pain often forces the patient to stop all activity, whereupon relief usually comes promptly.

The severity of the pain is not an index of the severity of the disease. A sense of very slight pressure in the sternal region can occur in a patient with widespread coronary atherosclerosis, whereas involvement of much lesser degree may cause pronounced symptoms. Frequent attacks, especially if they occur on slight to moderate exertion, usually mean that myocardial infarction will supervene in the not too distant future, but this is not always true.

b. Atypical syndromes: Pain with the characteristics described under *a* may have an unusual location or distribution. Sometimes there is pressure alone. A few patients do not interpret their feelings as pain or pressure and may be unable to distinguish it from dyspnea. Careful questioning, often at some length, reveals the true nature of the complaint.

The location of the chest pain varies but there is usually no confusion if it radiates into the left arm or if it is definitely related to exertion. The main locus is sometimes to the left of the sternum, the precordium, the epigastrium, or the sternal notch. At times it is felt in the back between the shoulder blades and sometimes is extrathoracic altogether. When this occurs the most common place is the medial side of both forearms. The patient often complains of aching in these regions. Sometimes the left side of the neck with or without extension into the jaw is the main site of the pain. One or the other or both, but usually the left upper extremity is complained of. The symptom is always on the medial side and may involve the entire limb or be localized in a smaller area, such as the midarm, the ulnar side of the elbow, the wrist, or the fingers. The chief complaint is sometimes that on exercise "the breath" is completely "shut-off" in the neck.

When there is chest pain it may radiate into any of the regions or combinations of them as just mentioned in the preceding paragraph. When it extends into both arms it usually feels worse in the left, although the opposite is sometimes true.

Angina pectoris may occur only in the morning, usually after breakfast, and the patient feels well for the remainder of the day.

2. *Angina pectoris at rest (angina decubitus):* This term is applied to cases in which there is no clear relation between onset of the symptom and a precipitating cause such as exertion, emotion or a meal. The duration is often longer and may be up to one but rarely two hours. It may appear in any of the numerous forms described under the exertional type.

Nitroglycerin nearly always relieves the pain of angina pectoris, and the employment of this drug might be considered as a quasi therapeutic test in diagnosis. One must remember, however, that nitroglycerin sometimes relieves pain due to other conditions and that it may fail to relieve that due to angina pectoris.

Angina decubitus often occurs at night or in early morning, awakening the patient from sleep. Its frequency is variable. Some people experience it once a week or less. At times there are exacerbations in which attacks become more severe, more prolonged, and more frequent. Ten to twenty or more of them may be experienced in a single day. The condition of such a patient is most precarious. In a person who previously experienced only exertional angina with or without an occasional episode of angina at rest these are termed the premonitory signs of myocardial infarction. Although the latter usually supervenes, a few persons "ride through" and escape infarction. They then have a remission, and the symptoms are much the same as before.

There are some patients who remain in a chronic state of angina decubitus, and an attack is precipitated either spontaneously or on the most trivial exertion. This may last for months, rarely years. Myocardial infarction or sudden death can occur at any time.

Angina at rest is not infrequently precipitated by a paroxysmal cardiac arrhythmia. Ectopic arrhythmias should be considered as a possibility in every case. It is sometimes initiated by extracardiac causes, such as pulmonary embolism, acute and chronic anemias, shock from any cause, and sudden chilling.

Although all angina pectoris is coronary insufficiency, some attacks are commonly designated "coronary insufficiency" to differentiate more or less regularly recurring angina pectoris without symptoms and signs of shock from sudden attacks of severe, prolonged anginal pain accompanied by shock, usually mild and frequently in the form of weakness and sweating, but not follow by the manifestations of myocardial infarction.

3. *Myocardial infarction:*

a. Typical syndrome: Substernal pain of the kind and distribution described for angina pectoris. The differences are usually an absence of exciting cause, longer duration, often shock, and absence of relief by the use of nitroglycerin. Myocardial infarction is seldom related to exertion, although unusual exercise is responsible for onset in some cases. The pain usually lasts for hours and usually waxes and wanes in intensity. When located in the region of the xyphoid or epigastrium spasm of the muscles of the upper abdominal wall is frequent. Neither the duration nor the severity of the pain is reliable in gauging the size of an infarct. Shock is mild in many cases, and the individual merely feels weak. In others there is collapse and sometimes loss of consciousness or even convulsions. Nausea and vomiting are common. Cyanosis or a pale gray appearance often appears. Dyspnea and other signs of congestive heart failure including pulmonary edema sometimes occur at the onset or appear later on.

The rare occurrence of rupture of the interventricular septum is manifested by a rough systolic murmur similar to that heard in the "maladie de Roger."

Rupture of the heart causes cardiac tamponade. This is manifested by the sudden onset of extreme dyspnea, falling arterial pressure and rising venous pressure, and terminates in death in a short time. Sudden death is more common.

b. Atypical syndromes: Although the pain usually has the typical location and radiation, there are a significant number of patients in whom this is not true. Erroneous diagnoses can result because of this. The differential diagnosis of the various syndromes of coronary arteriosclerotic heart disease is discussed at the end. The more frequent atypical symptoms are: (1) Pain confined to the medial sides of both forearms. (2) Epigastric pain, nausea and vomiting, and abdominal rigidity simulating a "surgical abdomen." (3) Sudden onset of severe congestive heart failure, often manifested by pulmonary edema. The symptoms of this condition may overshadow that of pain. (4) "Silent" myocardial infarction is quite rare. The patient usually has so-called pain equivalents or the pain may be so mild that he does not complain to the physician unless specific inquiry is made. Stoic persons are prone to disregard symptoms unless they are very severe. Other people misinterpret mild to moderately severe pain. The commonest mistake is to consider it as "acute indigestion." A few patients have cough, mild pain, slight dyspnea, sweating, and weakness. The patient often considers this to be acute bronchitis or a virus infection. (5)) Rapid, irregular heart action with or without pain may cause the patient to seek medical aid. His usual complaints are palpitation of the heart and dyspnea.

4. Sudden death: Coronary arteriosclerotic heart disease is by far the commonest cause of sudden death within a few minutes. This is nearly always the cause in persons who were previously in apparent good health.

5. Asymptomatic coronary arteriosclerosis: The disease may have advanced to a marked or to a terminal state and yet the individual experiences no symptoms from it. If an adequate routine examination is made the diagnosis is often made or suspected. In others, no clinical manifestations are presented. Such cases are truly subclinical.

6. Congestive heart failure: This condition sometimes occurs in older persons without pain or the presence of any other etiologic agent. The onset is gradual, and the heart is found to be enlarged.

PHYSICAL FINDINGS

These are variable and are dependent upon the stage of the disease and especially the symptomatology already discussed.

1. Angina pectoris, exertional type: Cardiac enlargement may or may not be present. In some instances there are cardiac murmurs, the commonest of which is systolic, loudest at the apex. This is transmitted toward the back or toward the base depending upon its intensity. It may have a musical quality but is usually a relatively high-pitched blow. It is due to dilatation of the left ventricle. An aortic systolic murmur is not uncommon. It is usually rough and may be transmitted into the neck. This is found in older patients with atherosclerosis of the ascending aorta, which is often accompanied by elongation and buckling of this vessel with or without senile ectasia. Peripheral arteriosclerosis is seen in many cases. This is manifested by: systolic hypertension; arterial changes in the eyegrounds; visible, tortuous, pulsating, hardened arteries of the neck, arms, and less often the legs, and absence or greatly diminished pulsations in the dorsalis pedis and/or the posterior tibial arteries.

Extrasystoles or paroxysmal ectopic arrhythmia sometimes are produced by exertion. The intensity of the heart sounds may be diminished, but, since the loudness of these sounds is highly variable in both healthy individuals and in those with heart disease, this sign is of little or no value.

Diabetes mellitus and essential hypertension accelerate the progress of arteriosclerosis in all directions.

2. Angina pectoris at rest: The physical findings are similar to those of angina pectoris, exertional type. The heart sounds may be muffled or an ectopic paroxysmal arrhythmia may be present during an attack.

3. Myocardial infarction: For convenience the physical findings can be divided into two main groups: (1) None or practically none, and (2) pronounced. Between the two there are all grades of intermediate manifestations.

Cases exhibiting minimal or no abnormal physical findings: The only evidence of myocardial infarction may be the patient's complaint and electrocardiographic changes. A slight rise in temperature (24 to 72 hours later), a slight drop or less commonly a rise in the blood pressure, increased erythrocyte sedimentation rate, tachycardia (transient), and a pericardial friction rub are all that are noted. This group must be differentiated from patients with acute fibrinous pericarditis. Serial electrocardiograms (see below) are the main means by which this is done.

Cases exhibiting pronounced abnormal physical findings: Severe shock is present. The patient appears ashen-gray or is frankly cyanotic, and he is cold, clammy and sweating profusely. Usually there is orthopnea. The blood pressure is low or cannot be read. The temperature is often subnormal. The radial pulse is rapid, weak and thready or cannot be palpated. The heart is usually enlarged, and the sounds are of poor quality. Tic-tac sounds or no sound at all can be heard. Rales at both bases, especially the right posterior, are seldom absent.

If the patient survives there are: fever (up to 101° F. to 104° F.), increased erythrocyte sedimentation rate, polymorphonuclear leukocytosis, rising blood pressure, decrease in heart rate to normal or near normal, increased loudness of the heart sounds, a pericardial friction rub, and general improvement of appearance and feelings. These occur 24 to 72 hours after onset. The friction rub is elusive in that it appears and disappears at unpredictable intervals. Because of this it is often missed. These signs slowly subside in a few days but may last for one to two weeks.

Arrhythmias, particularly extrasystoles, are common. Auricular fibrillation, transient or permanent, is not infrequent. Ventricular tachycardia fortunately is not seen too often. It usually presages the nearly always fatal ventricular fibrillation. Various grades of heart block from first degree to complete have the onset at the time of infarction or appear later.

Congestive heart failure results in some patients. Needless to say, it is greatly augmented by auricular fibrillation or ventricular tachycardia. Heart failure is likely to occur in patients with multiple infarcts.

4. Sudden death: In a person who was perfectly well and who dies suddenly (within a matter of minutes), one is justified in attributing the cause to coronary arteriosclerotic heart disease. In a patient who has sustained an injury, even if very mild and especially if it involves the lower extremity, massive pulmonary embolism must be seriously considered. In the case of medical patients who are confined to bed for long periods (weeks or months) and in postoperative cases massive pulmonary embolization may be the cause. A certain diagnosis can be established only by post mortem examination.

5. Asymptomatic coronary arteriosclerosis: For obvious reasons the diagnosis of this condition is rarely made during life. These have been explained in the section describing symptoms. Some persons presenting themselves for routine physical examinations or because of some other complaint may have their disease recognized. The main evidence is left ventricular enlargement, with or without non-specific electrocardiographic alterations. In addition, no other cause for the cardiac enlargement, such as essential hypertension, aortic or mitral lesions, is found. Other evidence of arteriosclerosis is helpful.

The physician is on more certain ground if the patient is more than 50 years old. In younger individuals the condition should be strongly suspected.

6. Congestive heart failure: In those cases in which arteriosclerosis involves the finer radicles of the coronary arterial tree, thrombosis and closure by plaque formation causes small infarcts which involve only a few muscle fibers at a time. These are replaced by fibrous tissue. The patient does not experience pain. As the process continues over many years, a large part of the myocardium becomes fibrotic. Those fibers that are left intact often undergo compensatory hypertrophy. Finally the heart becomes a large fibrous bag, so to speak; it is no longer an effective pump and congestive heart failure appears.

The patient is usually a man over 50 years of age with a large heart and congestive heart failure which had a gradual or rapid onset, usually the former. Arteriosclerosis may or may not be present elsewhere. When essential hypertension is present, the diagnosis is less certain. Although extremely rare, this type of coronary arteriosclerosis is not unknown to occur in younger persons.

ELECTROCARDIOGRAPHY

Abnormalities of the electrocardiogram are not per se diagnostic of coronary artery disease. Interpretation of the form of the ventricular complex must be made in the light of the entire clinical picture. On the other hand, some patients with severe coronary artery disease exhibit electrocardiograms which are well within the limits of normal. There has been a tendency on the part of some physicians to interpret minor deviations and conduction defects as indicating coronary disease. In an asymptomatic individual without other supporting evidence such a conclusion is not justified.

1. Angina pectoris, exertional type: The resting electrocardiogram may be within normal limits. Nonspecific changes such as T wave inversions in leads I and/or II and in the leads from the left side of the precordium are not uncommon. Sometimes there is inversion of the T wave in lead I only with or without flattening of this deflection in leads V_5 and V_6. A flat or inverted T wave in lead II is probably abnormal in patients with angina pectoris. Since a large number of these patients have long-standing essential hypertension, the findings due to left ventricular hypertrophy are not uncommonly seen. Incomplete or complete right or left bundle branch block or other defects of intraventricular conduction are sometimes found. QRS alterations with or without T wave changes suggesting old myocardial infarction may be found (see *myocardial infarction).*

During an attack T wave changes with or without deviation of the RS-T segment from the isoelectric level are often observed. Probably the commonest change is downward displacement of the RS-T segments in leads I and II and in all of the precordial leads or in the leads from the right or the left side of the precordium. In other instances the T waves become inverted in the leads mentioned. Rarely there is upward displacement of the RS-T segments in these leads. Downward RS-T displacement or T wave inversion or rarely upward RS-T displacement sometimes appears in leads II and/or III and VF. A record of a spontaneous attack of exertional angina pectoris is rarely obtained.

In patients with a typical history and who are 50 or older it is fair to ascribe nonspecific electrocardiographic changes to coronary arteriosclerosis. A normal electrocardiogram or the absence of other abnormal findings does not rule out the condition.

When the electrocardiogram is within the limits of normal it is sometimes necessary to try to induce an attack and to record the electrocardiographic changes if they occur. This is done by having the patient perform an amount of exertion which ordinarily precipitates pain. In the physician's office the patient has a certain security, and hence the emotional factor is often absent. As a result he may be able to perform many times the amount of exercise without experiencing the symptom of pain. Because of the risk of causing myocardial infarction or sudden death, exercise tests should be limited to the following:

1. All persons under 40 years because of the obvious implications of the diagnosis.

2. In patients 40 through 49 years the subject may elect to have the procedure performed after an explanation has been given.

3. Age is not a factor when the resting electrocardiogram is normal and the individual is in a "key position" in which a question of military service or benefits, application for insurance or question of insurance benefits arises, or litigation of various sorts is involved. The test may be extremely important in cases with atypical symptoms.

A positive test consists of any of the changes described in the second paragraph of this heading. When pain is present minor deviations from the normal become more significant. A negative test (absence of electrocardiographic changes during an induced attack) does not exclude the presence of coronary arteriosclerosis.

2. *Angina pectoris at rest (angina decubitus):* Between attacks the electrocardiogram may be normal or may show any of the nonspecific changes described under exertional angina pectoris. During an episode of pain alterations similar to those recorded after exercise in patients with exertional angina may appear. Sometimes the electrocardiogram remains normal or does not deviate from that recorded when the patient is free of symptoms. In a few individuals one may be able to demonstrate that an ectopic rhythm such as paroxysmal auricular or ventricular tachycardia or auricular flutter or fibrillation is responsible for inducing the episodes.

3. *Myocardial infarction.* When there are typical alterations in the form of the ventricular complex, the diagnosis of fresh and recent infarction can be made by serial electrocardiograms alone. Fresh infarction, one a few hours to a few days old, is characterized by upward displacement of the RS-T segments. In recent infarction, days, weeks or even months old, abnormal Q wave or QS deflections appear, the RS-T segments return to the isoelectric level but display an upward convexity, and the T waves become deeply and symmetrically inverted. In the old infarction, i.e., months or years old, the QRS changes persist but the T waves gradually return to the upright position. In the earliest stage of fresh infarct without QRS changes, the differentiation from pericarditis is made by observation of the clinical course and subsequent tracings. These electrocardiographic characteristics must be correlated with the clinical history in order to establish the exact time that the infarct occurred. For example, the electrocardiographic findings of recent infarction may persist for years.

Abnormal Q waves or QS deflections without T wave changes nearly always indicate that an infarct occurred months or years before. The history nearly always discloses the exact time. Abnormalities of the kind in question have occasionally been recorded in patients without any symptoms or signs of heart disease. In these it is extremely unlikely that infarction has occurred.

The location and extensiveness of myocardial infarction is best shown by the electrocardiogram. The larger the infarct the greater the number of leads that will exhibit QRS abnormalities. Depending upon the lead showing abnormal Q waves or QS deflections infarcts may be classified as follows:

Anteroseptal—Leads V_1 through V_3 or V_4.

Anterolateral—Leads V_4 through V_6.

Midanterior—leads from the midprecordium.

High anterolateral — QS abnormal Q waves (0.04 second or more) and upwardly convex RS-T segments and inverted T waves in lead VL. The standard precordial electrocardiogram may remain normal or exhibit inverted T waves in one or more leads. Occasionally there are questionable QRS changes, and in a few instances the standard precordial electrocardiogram is entirely normal. In such cases leads from higher levels on the anterolateral chest wall, made higher one, two and three interspaces respectively in the lines of the standard precordial leads, disclose the diagnosis.

Myocardial infarction with T wave changes only occurs. When the anterior wall is involved there are upwardly convex, isoelectric RS-T segments and deeply inverted, symmetrical T waves in all or nearly all of the leads comprising the precordial electrocardiogram. In posterior infarction of this kind of RS-T segmental alterations and T wave inversions are seen in leads II, III, and VF. In either case, the T waves gradually become upright within several months.

Posterior infarction shows these changes in leads VF and III and/or II. A Q wave of 0.04 second or more in lead VF strongly suggests posterior infarction.

Posterolateral infarction shows these changes in leads VF, III and/or II and the leads from the left side of the precordium.

Posteroinferior infarction gives the same changes as plain posterior infarction, but in addition lead VE also exhibits diagnostic changes.

High posterolateral infarction shows the diagnostic changes in lead VL. All leads from the anterolateral chest wall, including those from higher levels, remain normal. Leads from the left posterior chest wall display progressive changes in serial tracings.

Myocardial infarction may be complicated by right bundle branch block. The QRS, RS-T and T wave changes of both anterior and posterior infarction are not concealed, but may be slightly modified.

In cases of myocardial infarction complicated by left bundle branch block, the changes in the ventricular complex are nearly always concealed. When the QRS complexes are small, characteristic RS-T segmental displacement and T wave inversions may be found in a series of tracings. If the infarct involves the interventricular septum, abnormal Q or QS deflections may appear.

In cases of myocardial infarction complicated by local intraventricular block, there are the signs of infarction, usually posterior, the QRS interval is more than 0.10 seconds, and neither right nor left bundle branch block is present.

Transient QRS changes or transient bundle branch block may occur.

Persistent displacement of the RS-T segments presenting signs similar to those of fresh infarction after months or years usually indicates that ventricular aneurysm is present.

Reciprocal (or confirmatory) QRS, RS-T and T wave changes of both anterior and posterior infarction have been omitted from this discussion in order to make it less complex.

Subendocardial infarction is indicated by downward RS-T displacement and sometimes abnormal Q waves in several or all of the precordial leads. In days or weeks, the RS-T segments return to the isoelectric level and the T waves become inverted. Posterior infarction must be excluded. It is rare that such findings are present in leads VF, III, and/or II.

Myocardial infarction sometimes occurs without any electrocardiographic manifestations. If the patient has all of the typical symptoms and the physical findings of this condition, it is very rare that the electrocardiogram does not show some change. In such cases, proper treatment should be instituted. It is fair to assume that the infarct is not a large one provided frequent tracings fail to display any deviation from the control.

Silent myocardial infarction is one which occurs without the complaint of pain. Serial electrocardiograms exhibit the characteristic QRS and T wave changes as described above. This is extremely rare and occurs in the older age group.

In some cases of known infarction both QRS and T wave changes regress so that after several months or years the electrocardiogram is well within normal limits. More often there are some residual changes.

Multiple infarcts occur in almost any conceivable combination. The electrocardiograms of these are often quite complex.

TELEOGEONTGENOGRAPHY AND FLUOROSCOPY

The x-ray examination is not a very valuable aid to the diagnosis of coronary artery disease. However, it may reveal: (1) Left ventricular enlargement, with or without signs of congestive heart failure. These have the same significance as described under physical findings. (2) The presence of a ventricular aneurysm is revealed as a local dilatation of the left ventricular wall. Fluoroscopically, when the main mass of the left ventricular muscle passes into systole this local dilatation is found to become larger than it is during diastole. Old myocardial infarction is for all practical purposes the sole cause of ventricular aneurysm.

DIFFERENTIAL DIAGNOSIS

Space will not permit a discussion of this subject. Below is a tabulation of diseases from which coronary artery disease may have to be differentiated.

(Continued on page 392)

Penicillin Suppositories in Abdominal and Vaginal Hysterectomies[*]

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At the meeting of the Chicago Gynecological Society in January 1950, S. J. Turner, M.D., of Mt. Sinai hospital, reported a series of 100 nonselected vaginal hysterectomies in which a penicillin vaginal suppository was used 12 to 14 hours before surgery.[1] In that series, the morbidity was 7 per cent, in contrast to 34.8 per cent in the control group, and in further contrast to a rate of 26 to 42 per cent which has been reported in the literature.

This marked reduction in postoperative morbidity encouraged its use on the obstetrical and gynecological service of Wesley Memorial Hospital, Chicago. Since that time, each patient scheduled for vaginal or abdominal total hysterectomy has received a vaginal suppository containing 100,000 units of crystalline potassium penicillin-G as part of the routine preparation the night before surgery.

MATERIAL

The cases in the present series were those of patients from the private practices of G. H. Gardner, M.D., George Bradburn, M.D. and Byford Heskett, M.D. Operative techniques of these men are closely similar, and have not varied materially in the last several years. Each patient had the usual preparatory routine on the evening before surgery, consisting of abdominal and perineal care, oil and tap water enema and cleansing vaginal douche of 1:2000 aqueous Zephiran Chloride. There was a total of 140 patients who had had abdominal or vaginal hysterectomies during 1950, and for whom a vaginal suppository of penicillin was administered following the other routine preparation. A group selected for control study consisted of an equal number of patients from the years 1948 and 1949 in whom no suppositories were used. In each case reported there was a careful cleansing of the vagina and cervix with Mercresin immediately before surgery. Each patient received a general anesthetic and was given transfusions of whole blood when indicated.

A temperature of 100.4° F. or more on any two days following surgery was taken as the standard of morbidity.

RESULTS

There were no deaths in the entire series.

The average length of postoperative hospital stay was the same for the two groups (table I).

TABLE I
Results for Entire Series

	Group not receiving suppository	Group receiving suppository
Number of patients	140	140
Average postoperative stay	12.6	12.8
Morbidity	19.2%	12.1%
Cause:		
Unknown	15	8
Cystitis	3	6
Pelvic cellulitis	6	2
Thrombophlebitis	–	1
Wound infection	2	–
Pulmonary embolus	1	–
Number of patients staying more than 14 days	32	35

Twenty-seven, or 19.2 per cent, of those patients in whom the suppository was not used, had a morbid postoperative course. Of those receiving the suppository, there was an overall morbidity of 17 cases, or 12.1 per cent.

The various causes for morbidity in the two groups are listed. The majority in both groups consisted of patients in whom no definite cause for rise in temperature could be determined.

The number remaining in the hospital more than 14 days postoperatively was about the same in each group.

For the group having abdominal hysterectomies as a part of their operative procedure, the total number of patients, average length of postoperative stay, morbidity, and number staying

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TABLE II
Results for Patients with Abdominal Hysterectomies

	Group not receiving suppository	Group receiving suppository
Total number of patients	81	79
Average postoperative hospital stay	11.2	11.5
Morbidity	12.3%	12.6%
Cause:		
Unknown	6	6
Cystitis	–	2
Pelvic cellulitis	1	1
Thrombophlebitis	–	1
Wound infection	2	–
Pulmonary embolus	1	–
Number of patients staying more than 14 days	8	10

over 14 days were the same whether or not the suppository was used (table II).

Total number and average postoperative stay of those patients having a vaginal hysterectomy with or without plastic repair were similar (table III).

TABLE III
Results for Patients with Vaginal Hysterectomies

	Group not receiving suppository	Group receiving suppository
Total number of patients	59	58
Average postoperative hospital stay	14.6	14.6
Morbidity	27.4%	10.2%
Cause:		
Unknown	9	1
Cystitis	3	4
Pelvic cellulitis	5	1
Number of patients staying more than 14 days	24	23

Morbidity differed in the two groups, however. Out of 59 cases which did not receive the suppository, 17, or 27.4 per cent, were morbid, while only 6 of 58, or 10.2 per cent, of those receiving the suppository ran a morbid course. The rate was therefore cut to one-third of that which might be expected. This is even more noteworthy, when it is realized that one-half of the 17 cases in the first group received prophylactic penicillin intramuscularly prior to and following surgery as a part of their routine treatment. No patient given a suppository received penicillin prophylactically.

There were nine in the first group and one in the second in whom the cause for elevated temperature was not determined. Cystitis accounted for an equal amount of the morbidity in both groups. Pelvic cellulitis was the cause of morbidity in five of that group in which no suppository was used; two of these had been given prophylactic parenteral penicillin. The number staying over 14 days was equal in both groups.

COMMENT

Although the series is not large enough to allow definite conclusions to be drawn, nevertheless certain impressions may be gained. A more valid evaluation statistically would have resulted if the suppository had been given to every other patient, the alternate patients forming a second comparable series.

The morbidity in the group of abdominal total hysterectomies was apparently unaffected by the use of the suppository. On the other hand, the morbidity rate in vaginal hysterectomies at Wesley Memorial hospital was reduced about one-third by the use of the suppository the night before surgery. This reduction occurred despite the fact that half of those patients not receiving a suppository were given prophylactic parenteral penicillin. The amount of pelvic cellulitis and infection of hematomas at the vault of the vagina also appears to be markedly reduced by these suppositories.

No untoward reactions to the suppository were recorded. Since the method is simple and inexpensive, it seems worthy of continued use in patients in whom vaginal hysterectomy is to be done.

REFERENCE

1. Turner, J. S.: The effect of penicillin vaginal suppositories on morbidity in vaginal hysterectomy and on vaginal flora. Am. J. Obst. & Gynec. 60:806, 1950.

Notices . . .

Postgraduate Course in Gastro-Intestinal Roentgenology
A continuation course in gastro-intestinal roentgenology for radiologists will be presented at the Center for Continuation Study at the University of Minnesota October 20 to 25. The course will be presented under the direction of Dr. Leo G. Rigler, professor and head of the department of radiology and physical medicine, and the faculty will include members from the University staff as well as a number of visiting instructors.

On Wednesday, October 22, the annual Leo G. Rigler lecture will be given by Dr. B. J. Kirklin, professor of the department of radiology of the Mayo Foundation, Rochester.

* * *

The American College of Surgeons will hold its thirty-eighth annual Clinical Congress at the Waldorf-Astoria hotel in New York City September 22 through September 26. Sixty-two hospitals in the New York area will participate in a program of operative clinics and demonstrations. Headquarters of the college are at 40 East Erie Street, Chicago.

MEDICAL
SCIENCES
REVIEWS

In the interests of continuing medical education, The Journal-Lancet *offers this department of authoritative reviews of important progress in scientific medicine, both in the fundamental and the clinical fields. The editors propose to define medical sciences very broadly, and hope that each subject treated will be of sufficient importance to interest every reader.*

Experimental Atherosclerosis[*]

Part Two

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FACTORS INFLUENCING EXPERIMENTAL ATHEROSCLEROSIS

With the achievement of biochemical, physiological and pathological quantitations in atherosclerosis research, considerable progress has been made in assaying the effects of various exogenous and endogenous factors on experimental atherogenesis.

Thyroid hormone: Among the endocrines, the thyroid has a marked influence on experimental atherosclerosis.[*] The addition of desiccated thyroid to the diet of cholesterol-fed rabbits or chicks results in marked depression of hypercholesterolemia and retardation of the atherosclerotic process. This hormone has a similar effect on estrogen-induced atherosclerosis of cockerels. One of the foremost problems confronting atherosclerosis research is the elucidation of the precise mechanism of these effects of thyroid hormone on atherogenesis.

Estrogens: Recently, estrogenic hormone was shown to have a marked effect on experimental atherosclerosis in chicks. When cholesterol and estrogens are given concurrently, coronary atherogenesis is markedly inhibited. However, cholesterol-induced aorta atherogenesis proceeds unaffected. Moreover it was also shown that estrogen administration reverses coronary lesions previously induced by cholesterol feeding, even when cholesterol feeding is continued during the period of estrogen exhibition. Here again estrogen reversal of cholesterol-induced coronary atherosclerosis is associated with no effect on aorta lesions.

These experiments on estrogens and cholesterol-induced coronary atherosclerosis are of significance for several reasons. First, the plasma lipid data recorded in these studies suggest that the plasma ratio of cholesterol to phospholipids (C/P ratio) may be a significant factor in coronary atherogenesis. Thus in all birds protected from coronary atherogenesis by estrogen exhibition, plasma C/P ratios are at or near normal levels, in contrast to the control chicks fed cholesterol without estrogens, wherein C/P ratios are uniformly elevated. Further, the results of these experiments afford a lead to possible mechanisms of the well known human sex differential in susceptibility to coronary atherosclerosis. Finally, the results of these investigations highlight an important lesson for atherosclerosis research. Hitherto most investigators of experimental atherosclerosis tacitly assumed that atherogenesis proceeds in different arterial beds based upon essentially similar biological laws. Hence, most workers confined their studies to the aorta and interpreted their findings as valid for atherogenesis in the coronary, renal, cerebral and other arteries. The results of the foregoing experiments on estrogens and coronary and aorta atherogenesis demonstrate this to be a fundamental methodologic error. Since estrogen exhibition inhibits coronary atherogenesis, in cholesterol-fed cockerels without exerting any effect on aorta atherogenesis it may be concluded that different laws determine atherogenesis in the aorta and coronary arteries. Hence, workers in experimental atherosclerosis cannot confine their observations to the aorta.

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[*] In order to induce atherosclerosis in dogs, cholesterol feeding must be combined with suppression of the thyroid gland with thiouracil.

In addition to the foregoing studies on estrogens and experimental atherosclerosis, several experiments analyzed the effects of androgens, pituitary gonadotrophins and/or gonadectomy on cholesterol-induced lesions, with results of only limited significance up to the present time.

Adrenal steroids and ACTH: Among other hormonal factors possibly influencing atherogenesis, interest today centers upon newly available pituitary-adrenal preparations, particularly ACTH and cortisone. Observations in man stress the need to investigate their effects. Thus, patients with hyperadrenocorticism, e. g. Cushing's syndrome, exhibit severe atherosclerosis. Patients on chronic cortisone therapy develop elevations of plasma cholesterol levels. The active role of the adrenal cortex in cholesterol metabolism is shown further by its high concentration of cholesterol, its ability readily to discharge cholesterol, to synthesize cholesterol and to accumulate ingested cholesterol.

Experimental investigation of the relationships between the pituitary-adrenal axis and atherogenesis is still in its early stages. Recently we carried out studies on the effects of three adrenal steroids — desoxycorticosterone (DCA), cortisone and hydrocortisone (compound F)— on plasma lipids, blood pressure and atherosclerosis in chicks. In brief, the mineralo-corticoid DCA does not significantly alter either the normal plasma lipid pattern of cockerels fed plain mash, or the degree of hypercholesterolemia in birds given a cholesterol diet.* In the absence of a dietary cholesterol supplement, cholesterol-type lesions are not induced by DCA, nor is spontaneous atherogenesis of the aorta intensified. In birds fed 0.25 per cent cholesterol diets, however, DCA administration does intensify aorta atherogenesis. Similarly, in cholesterol-fed cockerels, chronic cortisone administration results in significantly greater incidence and severity of gross cholesterol-induced aorta and coronary atherosclerosis. This intensified atherogenesis with the glycocorticoid cortisone supervened, although hypercholesterolemia, phospholipemia, C/P ratios and blood pressure levels are not significantly different in the steroid-treated and control groups.

Our experiments with compound F were done in the depancreatized chick. Prolonged exhibition of compound F to such depancreatized cockerels induced marked chronic hyperglycemia. Thus a chick preparation with a steroid type diabetes is available for atherosclerosis research. Our data indicate that when such depancreatized compound F treated diabetic chicks are fed cholesterol, a hypercholesterolemia develops far in excess of that exhibited by uninjected depancreatized cholesterol-fed birds. Despite this inordinate hypercholesterolemia, aorta atherogenesis is no more extensive than in the control group. No data are as yet available on coronary atherogenesis in these cockerels. Further studies are currently in progress with this and other adrenocortical preparations.

Pancreas: The foregoing study on atherogenesis in the steroid diabetic chick is of interest, not only from the point of view of the effect of corticoids on atherogenesis, but also from the aspect of atherogenesis in diabetic animals. The combination of glycocorticoid administration plus pancreatectomy is essential for producing diabetic hyperglycemia in chicks, since normoglycemia prevails in the depancreatized cockerel. Studies on this latter type of preparation have also been carried out in our laboratory. In totally depancreatized cockerels fed a regular mash, free of cholesterol or other supplements, both plasma lipid and carbohydrate levels are within normal limits. These birds exhibit no overt signs of metabolic disturbance. Lesions of the induced variety do not develop, although these chicks exhibit a tendency to intensified spontaneous arteriosclerosis. Stilbesterol-treated, depancreatized birds also exhibit a plasma lipid pattern essentially similar to that of their unoperated controls.

When a supplement of cholesterol and cottonseed oil is added to the mash of depancreatized cockerels, a plasma lipid pattern emerges that is significantly different quantitatively from that of their paired controls. They consistently exhibit a far more severe hypercholesterolemia; this is accompanied by intensified atherogenesis.

Our studies on atherogenesis in the depancreatized cockerel and in the depancreatized steroid treated cockerel indicate that in the chick, as in man, the pancreas apparently plays an important role in the metabolism of both the lipids and carbohydrates. This biologic similarity emerges despite initial data indicating that pancreatic deficiency has different effects on metabolism in chick and man. Hence, it may be anticipated that further study of the relationship of the pancreas to atherogenesis in the chick will yield information of significance for our understanding of the atherogenic processes in diabetic man.

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*In accord with previous observations, chicks receiving DCA developed hypertension when salt was present in the diet, plus polydypsia, arteriolonephrosclerosis and other changes.

Among other species in which this problem has been pursued, the rabbit is the animal most intensively investigated to date. When alloxan diabetes is combined with cholesterol feeding in rabbits, atherogenesis tends to be retarded. This somewhat unexpected observation has recently been correlated with the particular patterns of circulating lipoprotein molecules ultracentrifugally observed in such a preparation.

Relatively few reports are available concerning the effect of experimental diabetes on atherogenesis in other species. Among numerous studies, a few indicate that atherosclerotic lesions eventually develop in chronic diabetic dogs, particularly in completely depancreatized insulin maintained animals subsisting on a diet of moderate to high fat content without supplementary raw pancreas or lipotropic factors. In the rat, the species which to date has proved to be particularly resistant to cholesterol-induced atherosclerosis, efforts to produce lesions by a combination of cholesterol feeding and diabetes induction have so far met with failure.

It may be noted at this point that the study of the role of lipotropic factors in experimental atherosclerosis has its roots in the observation that totally depancreatized, insulin treated dogs can be chronically maintained only if fed a supplement of raw pancreas or its decisive lipotropic factors lecithin or choline. Hence, the extensive studies on lipotropic factors in atherosclerosis are an aspect of the problem of the role of the pancreas in experimental atherosclerosis (see below).

Hypertension: In view of the frequent clinical observation that hypertension is associated with intensified atherogenesis in man, we studied the interrelationship between these two pathologic processes in the experimental animal. Salt hypertension does not result in the development of gross lesions of the induced type, nor does it induce any definite intensification of spontaneous lesions. Thus, salt hypertension had little or no effect on *spontaneous* arteriosclerosis in cockerels. Similarly, in DCA hypertensive cockerels, fed no dietary supplement of cholesterol, no lesions of the induced type are observed, nor is there intensification of spontaneous lesions. It would appear that in the presence of consistent normocholesterolemia, hypertension is ineffective as an atherogenic stimulus, both with respect to causing the appearance of induced lesions and with respect to intensifying spontaneous lesions. This finding is in accord with observations in this and other laboratories with several other species, including rabbit, dog, sheep and goat.

In contrast to such negative results, desoxycorticosterone-salt hypertension does intensify cholesterol-induced atherogenesis in cholesterol-fed cockerels. This observation, too, is consistent with the findings of other workers utilizing rabbits and dogs. Hypertension intensifies atherogenesis when accompanied by a cholesterol diet. The mechanism of this effect remains obscure. However, the facts available from these experiments support the view enunciated by several investigators: Cholesterol is the decisive factor in the pathogenesis of atherosclerosis, whereas hypertension acts rather as an intensifying agent, exerting this effect when the lipid metabolic situation favors atherogenesis.

Vascular injury: Some workers attribute the effect of hypertension on atherosclerosis to a vascular damage presumably caused by hyperpiesis. Fundamental to such a concept is the problem: Is pre-existent vascular damage a prerequisite for lipid deposition and atherogenesis? Numerous attempts have been made to clarify this problem experimentally. A host of noxious agents has been tested for atherogenic effect, including bacteria, toxins, drugs, hormones, mechanical and thermal trauma. Although various vascular lesions may be experimentally produced by these methods, atherosclerosis has never been produced. Thus it would appear that in the absence of an essential lipid metabolic alteration, vascular damage, *per se,* is ineffective as an atherogenic stimulus. On the other hand, since atherosclerotic lesions develop in cholesterol-fed but otherwise normal chicks as young as five weeks of age, juvenile uninjured arterial tissue must be susceptible to atherogenesis, when the lipid derangement is severe. However, the further fact must be noted that foci of vascular damage are sites of predilection for deposition of atherogenic material, when the necessary lipid metabolic alteration is present. These several facts lead us to agree with Anitschkow's original concept, advanced many years ago, that cholesterol may be a primary atherogenic stimulus. We are also in accord with his further concept that vascular damage may play a role in the arterial deposition of lipids. These ideas, called the "combined theory" by Anitschkow, recognize that a number of different factors are involved in the pathogenesis of atherosclerosis; they also recognize the key role of the lipids in atherogenesis, whereby a severe enough derangement of lipid metabolism may result in atherogenesis in previously normal vessels; they further recognize that with only slight derangements in cholesterol metabolism, atherogenesis may still proceed, particularly in sites of predilection produced by previous vascular damage.

Age: In connection with these concepts on the role of vascular damage in the pathogenesis of atherosclerosis, consideration may be appropriately given at this point to the relationship between age and atherogenesis. As is well known the incidence and severity of atherosclerosis in man increase with age. However, significant atherosclerosis occurs in some young people and is absent in some old people.

Recent clinical research, demonstrating a tendency for plasma total cholesterol and S*f* 12-20 levels to increase with age, lends new support to the concept that atherosclerosis is a disease process resulting at least in part from alterations in cholesterol metabolism. These data suggest that the increased incidence and severity of atherosclerosis in older people may be at least in part related to alterations in cholesterol metabolism supervening in the latter decades of life. Findings in laboratory animals support this concept of the relationship between biologic aging and atherogenesis. Thus it has been shown in both chicks and rabbits that, (given the prerequisite alterations in lipid metabolism) atherosclerosis can be readily induced in very young arteries. It has been further demonstrated that both the cholesterolemic and atherogenic responses of chicks to cholesterol diets are influenced by age. The response of chicks at one age period is significantly different from that at another. The precise endogenous factors which effect such age-conditioned patterns of cholesterolemia and atherogenesis remain to be elucidated. Nevertheless, the conclusion appears valid that endogenous factors, conditioned by and varying with age, influence the organism's handling of exogenous cholesterol and thereby affect atherogenesis.

Heparin: In connection with the heightened interest of investigators in factors influencing the state of aggregation of plasma lipoproteins, attention has focused upon heparin. Intravenous heparin influences alimentary lipemia, effecting rapid clearance of plasma lactescence. This phenomenon is apparently related to the ability of heparin to disrupt globulin-lipid bonds, with release of the combined lipids and formation of a heparin-protein complex. Ultracentrifuge studies of this effect reveal that in both rabbit and man parenteral heparin shifts the lipoproteins of high S*f* classes into those of successively lower classes. In association with these shifts, cholesterol-fed rabbits receiving intermittent heparin injections show definite suppression of atherogenesis. This observation is additional new evidence concerning the significance for atherogensis of the plasma state of aggregation of cholesterol.

C/P ratios: In connection with the many sided investigation into the problem of the relationship between the plasma state of aggregation of cholesterol and atherogenesis, considerable work is also proceeding in experimental animals on the C/P ratio. Characteristically, cholesterol feeding effects both hypercholesterolemia and C/P ratio elevation in rabbits, chicks and thiouracil treated dogs. Atherosclerosis eventually supervenes in such animals. Such findings pose the problem: What is the key in atherogenesis? Is it hypercholesterolemia *per se*, or an elevated C/P ratio, or neither? Recently experiments have been designed to alter this plasma lipid pattern of cholesterol fed animals. In cholesterol fed rabbits for example, intravenous administration of detergents results in a rise in plasma phospholipid that parallels the hypercholesterolemia. Hence plasma C/P ratios are approximately normal. In such animals incidence and severity of atherosclerosis are decreased. These findings suggest that the rise in phospholipids effected by the detergents may have retarded atherogenesis.

Other recent studies in alloxan diabetic cholesterol fed rabbits also yielded data suggesting that when plasma phospholipids rise in proportion to cholesterol, atherogenesis is mitigated. Ultracentrifuge analysis of plasma from such a rabbit suggests, however, that the suppression of atherogenesis is related to the particular pattern of circulating lipoproteins, rather than to the C/P ratios *per se*.

In our laboratory estrogen-induced suppression of coronary atherogenesis is associated with a depression of C/P ratios to or toward normal levels. Further work is necessary to determine whether this is a cause and effect relationship, or whether the C/P alteration is merely a plasma lipid reflection of estrogen administration, unrelated to the associated effect on atherogenesis. Several other studies in this department on the relationship of C/P ratios to aorta atherogenesis have yielded negative results. In view of the contradictory data currently available further studies are necessary to determine the validity of the concept that C/P ratios are of fundamental significance for atherogenesis in various vascular beds.

Neutral fat: Among exogenous factors possibly influencing atherogenesis, considerable research has been done on the role of neutral fat intake. Experiments in several species demonstrate that neutral fat feeding *per se* (in the absence of a dietary cholesterol supplement) is not atherogenic. However, other data show that the level of dietary neutral fat is a significant factor influencing hypercholesterolemia and atherogenesis, when cholesterol is also administered. Thus high levels of neutral fat markedly intensify hypercholesterolemia and atherogenesis in the cholesterol-fed chick and rabbit. Further, the level of dietary neutral fat exerts significant influence on atherogenesis in the depancreatized cockerel.

Semistarvation: Another longstanding problem in atherosclerosis research—the relationships among total caloric intake, cholesterol intake *per se* and atherogenesis—has been clarified by recent experiments in rabbits and chicks. When cockerels are fed a limited diet containing cholesterol, hypercholesterolemia and atherogenesis proceed despite semistarvation. Atherosclerosis occurs in the absence of hyperphagia or obesity, provided the atherogenic stimulus—cholesterol—is present in adequate quantity in the diet. Similarly in rabbits fed a cholesterol diet restricted to 40 to 60 per cent of the food eaten by freely fed controls, hypercholesterolemia and atherogenesis develop. Multiple statistical correlations reveal that for the given level of hypercholesterolemia, atherogenesis is somewhat retarded in such underfed rabbits. Nevertheless, the fact remains that marked hyponutrition will not prevent atherosclerosis so long as the diet continues to contain cholesterol. Hence, these experimental findings serve to emphasize the particular significance of cholesterol (rather than overall caloric intake) for atherogenesis.

In another series of experiments, it was further shown that when cholesterol is fed for alternate periods of from one to five days in duration, the dietary pattern during the interim periods significantly influences atherogenesis. Thus, with starvation or a high neutral fat diet during the alternate (off cholesterol) periods, atherogenesis is greater in incidence and degree than with ordinary mash. Hence, overall adequate intake of a balanced diet apparently makes a key contribution to preventing dietary induced hypercholesterolemia and atherosclerosis. Whether this effect is mediated by dietary or endocrine factors, or both, remains to be elucidated.

Enteric cholesterol absorption: Since cholesterol undergoes an hemato-hepato-enteric circulation, the possibility presents itself that the intestinal disposal of cholesterol might be enhanced, and plasma cholesterol levels thereby reduced. In our department studies concerning this possibility have been in progress, utilizing a specially prepared aluminum hydroxide gel. The oral administration of this preparation decreases hypercholesterolemia and atherogenesis in cholesterol-fed cockerels. Similarly it was recently reported that the feeding of high levels of vegetable sterols, which are not absorbed by the intestinal tract, effect a depression of hypercholesterolemia in cholesterol-fed animals, apparently via operation of a competitive mechanism for cholesterol absorption. This avenue of approach to the prophylaxis and therapy of experimental hypercholesterolemia and atherosclerosis requires further exploration.

Lipotropic substances: Among the exogenous factors, interest has focused primarily upon lipotropic materials. Prior to the last year or two, the many published papers contained conspicuously contradictory results. Positive and negative reports were available in about equal number. However, recent experiments have served to clarify the picture considerably, at least from the laboratory point of view. These studies in the rabbit, the chick and the dog indicate clearly that lipotropic factors, among them choline, inositol and others, do not exert any significant prophylactic or therapeutic influence on cholesterol-induced hypercholesterolemia or atherogenesis. Our experiments in chicks utilized three levels of dietary cholesterol; 0.25, 0.5 and 2 per cent. Spontaneous and stilbesterol-induced atherosclerosis were also investigated. All experiments yielded consistently negative results; choline and inositol uniformly failed to protect cockerels against atherogenesis. In a very recent study we similarly observed that oral administration of lecithin and several pancreatic factors failed to prevent or retard cholesterol-induced atherosclerosis in depancreatized cockerels.

Some pharmaceutical houses are currently making extensive claims for the efficacy of various lipotropic factors in human atherosclerosis. These claims lack adequate foundation in clinical research. Altogether there is a paucity of clinical data on lipotropic factors and atherosclerosis. The few studies claiming a therapeutic or prophylactic influence of lipotropic factors on human atherosclerosis suffer from lack of adequate controls. For the rest, other studies

(Continued on page 390)

Lancet CLINICAL REVIEWS

This department of The Journal-Lancet *is devoted to reports on cases in which all the appropriate diagnostic criteria have been employed, the best known treatment administered and the results recorded. It is desired that these case reports be so prepared that they may be read with profit by physicians in general practice, hospital residents and interns and may be of considerable value to junior and senior students of medicine. This department welcomes such reports from individuals or groups of physicians who have suitable cases which they desire to present.*

Clinicopathological Conference

Minneapolis Veterans Hospital*

Edited by James F. Hammarsten, m.d.
Assisted by N. L. Gault, m.d. *and* R. I. Lubin, m.d.

PRESENTATION OF CASE

A 54 year old railroad agent was transferred to this hospital from the Hot Springs Veterans Hospital on February 23, 1951.

He was in good health until April 1950 when he began to have pains in the feet and ankles. This gradually became more severe and he developed pains in the knees, elbows, and wrists. He was given salicylates without relief and by July was so incapacitated that he quit working.

On August 10 he was admitted to a private hospital. He was given ACTH, 40 mg. daily, from August 15 to September 10. After 10 days of ACTH therapy he felt remarkably improved, was able to walk without difficulty and had no pain. On the twelfth day of treatment he became weak, and the weakness gradually increased.

ACTH therapy was resumed on about September 17, continued until the patient was discharged from the hospital on October 12, and given at home until October 25. He also received gold therapy during September and October.

He became weaker and his "muscles began to disappear." His feet and ankles became swollen. He was readmitted to the private hospital on November 1 and given intramuscular cortisone which was continued until admission to the Hot Springs Veterans Hospital on February 7, 1951. Despite cortisone therapy the joint pains returned on January 7, 1951 and on January 28, 1951 he developed numbness of both feet and the left arm.

In October 1948 he had several episodes of vomiting and abdominal pain. After x-ray examinations he was told that he had a duodenal ulcer. Treatment with an appropriate diet brought relief and he had no further gastrointestinal symptoms.

Physical and laboratory examinations at the Hot Springs hospital were identical to the examinations at this hospital.

He had a daily fever up to 101° F. and continued to complain of joint pains and weakness. He was transferred to this hospital on February 23 for further studies.

Physical examination revealed a chronically ill white male. There was extreme atrophy of all muscles of all extremities. There was slight limitation of abduction of the arms. A foot drop was present on the left. Minimal ankle edema was noted. The joints appeared normal.

A detailed neurological examination showed profound weakness of all extremities and paralysis of the left foot with only slight plantar flexion remaining. Reflexes of the upper extremities were equal and hyperactive. The knee jerks were equal and hyperactive. The right ankle jerk was hyperactive and the left was absent. Superficial reflexes were absent. There was impairment of pin prick sensation in all the distal extremities with the production of a burning sensation. Position and vibratory sensation was impaired bilaterally.

The temperature was 100° F., the pulse rate 100 per minute, and the blood pressure was 150 mm. Hg systolic and 96 diastolic.

The hemogram showed a hemoglobin of 10.7 gm. per 100 ml., and a white blood cell count of 9550 with 91 per cent neutrophils and 9 per cent lymphocytes. The erythrocyte sedimentation rate was 116 mm. in 1 hour. A blood Kahn was negative. The urinalysis showed 1+ albumin, a specific gravity of 1.024, 8 to 10 white blood cells and 1 to 2 hyaline casts per highpower field, and a negative test for reducing substances.

The blood urea nitrogen was 17.0 mg. per 100 ml., the potassium 4.52 MEq. per liter, the sodium 137 MEq. per liter, the chloride 88.6 MEq. per liter and the CO_2 24.3 MEq. per liter. The spinal fluid showed no cells, a negative complement fixation test, a negative gold curve, 38 mg. of sugar per 100 ml., and 48 mg. of protein per 100 ml.

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*Published with approval of Chief Medical Director. The statements and conclusions published by the authors are the result of their own study and do not necessarily reflect the opinion or policy of the Veterans Administration.

The cephalin flocculation was 3+ in 24 and 48 hours and the bromsulphalein retention was 5.5 per cent in 45 minutes. The 1 minute serum bilirubin was 0.1 mg. per 100 ml. and the total 0.2 mg. per 100 ml. The urine gave a positive test for urobilinogen and negative for porphobilinogen.

An x-ray film of the chest was normal.

He had a temperature of up to 101° F. daily and he continued to complain of severe pains in the hands and feet. He was given salicylates and narcotics for the pain.

On February 24 he complained of abdominal cramps. The cramps disappeared after an enema.

On March 1 and 2 he was given 81 mg. of BAL. At about 8:00 a.m. on March 2 he complained of severe abdominal pain and cramps, and then vomited. He perspired profusely and became pale.

He was seen by a surgical consultant who found abdominal distention and generalized abdominal tenderness. No bowel sounds were heard. Rectal examination was negative.

Urinalysis and hemogram were unchanged. X-ray films of the abdomen showed marked distention of the stomach, colon, and small intestines. A particularly large loop was seen in the right lower quadrant of the abdomen. There was free gas under the diaphragm.

He did not improve and at 5:30 p.m. on March 2 an operation was performed.

DISCUSSION

DR. WYMAN E. JACOBSON*: The patient being discussed today is a man in his fifties with arthritis or arthralgia, weakness, severe muscular atrophy, fever, edema, multiple neuritis with sensory and motor involvement, hypertension, anemia, neutrophilia, rapid sedimentation rate, albuminuria, abdominal cramps, intestinal obstruction, perforation of an abdominal viscus, and possibly a peptic ulcer. With such an array of signs and symptoms it is possible to entertain a large number of diagnoses. However, if I assume that these all stem from a single entity, it seems logical to say that the disease has multiple ramifications. It appears that the only obvious connecting link between them all is something involving the vascular system. With such assumptions I can make no other diagnosis than polyarteritis nodosa.

I would like, however, to go back and discuss each of the aspects of the disease in terms of the diagnosis of polyarteritis nodosa to determine whether the individual manifestations represent common occurrences in polyarteritis nodosa, whether they fit with the disease, or whether they are unusual or unheard of in such a disease.

Let us begin with the preliminary expression of his disease, namely, arthralgia. This was evidently interpreted as rheumatoid arthritis. ACTH therapy effected considerable improvement. Arthritis and arthralgia occur in a third to a half of all patients with polyarteritis nodosa. It may simulate rheumatic fever or rheumatoid arthritis.

Weakness occurs in 50 to 100 per cent of the cases reported. The extreme weakness has been thought by some to be related to an endocrine abnormality. The adrenal gland is frequently involved by arterial occlusions. The pancreas may also be involved and give rise to diabetes. The testes may be involved by thrombosis which later results in atrophy and fibrosis. However, since weakness occurs in polyarteritis nodosa much more commonly than disease is found in the adrenal glands, there is little reason to believe that the weakness represents acute or chronic adrenal insufficiency.

Muscle atrophy has been reported in approximately 20 per cent of the cases. Fever is almost a universal occurrence. Edema and polyneuritis occur in about 50 per cent. When motor involvement is seen, wrist and foot drop are frequent. Paresthesias of the hands and feet is extremely common. The polyneuritis has been attributed to involvement of the arteries supplying the nerves rather than cord involvement, although the cord and brain may be involved.

Hypertension occurs in about 50 per cent of the cases, anemia in 50 to 100 per cent, leukocytosis in most cases, and eosinophilia in about a third. Albuminuria is a very frequent indication of the renal involvement.

Gastrointestinal disturbances are extremely common. Abdominal cramps, without apparent major involvement of any specific organ, is a frequent cause for laparotomy. In one series a third of the cases had peptic ulcers. The ulcers were directly related to thrombosis of small arteries supplying the stomach or duodenum. Rupture of these ulcers has been reported. Intestinal obstruction occurs and has been attributed to thrombosis of mesenteric arteries.

Before discussing the preoperative episode I would like to mention BAL. A dose of 81 mg. is completely non-toxic. It is only when the dose approaches 5 mg. per kilogram of body weight that toxicity occurs.

It is obvious that this man had ileus, either mechanical or reflex. Furthermore, there was air under the diaphragm so that there is every reason to believe that an abdominal viscus had perforated. With this in mind I will discuss a few of the causes of free air in the peritoneal cavity. The first and most important cause is perforation of a peptic ulcer. Perforation of a diverticulum of the colon may also do so, although most usually the perforation is slow and walled off. Free gas may be found in the peritoneal cavity as a rare complication of a ruptured appendix. This occurs only when the appendix ruptures at the base. Instrumentation may also cause free air in the abdominal cavity. This includes such procedures as gastroscopy, proctoscopy, and enemas. This man had an enema seven days prior to this episode which seems so remote that it is unlikely it produced a perforation. A very uncommon cause of free gas in the peritoneal cavity is peritonitis with gas-forming bacilli. I was particularly interested in trying to discover whether mesenteric thrombosis with gangrene and subsequent rupture is a frequent cause of free peritoneal air. I have been told that these patients usually die before massive rupture occurs.

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*Clinical instructor in medicine, University of Minnesota; attending physician, Veterans Hospital; and chief of staff, St. Louis Park Medical Center.

In summary, then, I would consider this a rather classical case of polyarteritis nodosa with intestinal obstruction and a ruptured viscus. It is impossible for me to be very specific about which viscus ruptured. This man was known to have had an ulcer and peptic ulceration may occur as a complication of polyarteritis nodosa. If this is not an ulcer, my second choice is involvement of one of the mesenteric vessels with gangrene and perforation of some portion of the intestinal tract.

DR. BELL: Do you think ACTH had anything to do with your second possibility?

DR. JACOBSON: I would think that ACTH would more likely be related to a perforated ulcer. However, the time relationships make this unlikely.

DR. BELL: Cortisone and ACTH are supposed to heal the arteries and produce vascular occlusion.

DR. JACOBSON: Yes, they may thereby produce infarction; but what I was thinking is that cortisone increases the secretion of pepsin and has been reported as a cause for rupture of a peptic ulcer.

DR. HAMMARSTEN: About half of the students agreed with Dr. Jacobson, that the patient had polyarteritis nodosa, and they all believed a perforated ulcer was present.

DIAGNOSES

Clinical diagnosis: Perforation of a peptic ulcer? Polyarteritis nodosa? Toxic neuritis?

Dr. Jacobson's diagnosis: Polyarteritis nodosa. Infarction of intestine with perforation? Perforation of a peptic ulcer?

Anatomical diagnosis: Polyarteritis nodosa. Infarction of ileum with perforation. Carcinoma of prostate—small and non-contributory to death or symptoms.

PATHOLOGICAL DISCUSSION

DR. GLEASON: At operation there was a perforation of the ileum 3 feet from the ileocecal valve. The bowel in this area appeared non-viable and was resected.

Postoperatively he developed hypopotassemia, pulmonary edema, and died.

At autopsy there was generalized peritonitis and a second perforation of the ileum was found. The testes and kidneys showed numerous small infarcts grossly. On microscopical examination the surgical specimen and most organs showed typical lesions of polyarteritis nodosa. There was also a small carcinoma of the prostate which could not have been responsible for death or symptoms.

DR. HELLER: Visceral infarction, such as occurred here, has been reported following cortisone therapy for polyarteritis nodosa.[1]

DR. EBERT: Do you think the incidence of this disease is increasing?

DR. JACOBSON: Since the use of sulfonamides the incidence has probably increased. There is some speculation as to whether the sulfonamides are of any etiological importance.

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Meet Our Contributors . . .

Joseph M. Barker was graduated from the Georgetown University school of medicine in 1939, is cardiologist with the Yater Clinic, associate professor of clinical medicine, Georgetown University school of medicine, serves on the staffs of several hospitals. He is the author of a new book: "The Unipolar Electrocardiogram."

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Charles Donald Creevy was graduated from the University of Minnesota, where he is professor of surgery and chief of the division of urology at the University of Minnesota hospitals. He holds membership in many medical societies and has published scientific papers.

★

James Rogers Fox was graduated from the University of Minnesota in 1945, specializes in internal medicine, is assistant director of continuation medical education at the University of Minnesota, and associate editor of the Bulletin of the University of Minnesota hospitals.

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George M. Hart was graduated from Northwestern University medical school in 1943, specializes in orthopedic surgery at the Northwest Clinic, Minot, North Dakota, and serves on the staffs of Trinity, St. Joseph's, and Veterans Administration hospitals. He belongs to district, state and national medical societies.

Louis Nelson Katz was graduated from Western Reserve University in 1921, is director of the cardiovascular department, Michael Reese hospital, Chicago.

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Wallace W. Nelson was graduated from the Nebraska College of Medicine in 1943, took a rotating internship and medical residency at Wesley Memorial Hospital in Chicago. Since January 1952 he has been on the staff of the Grand Forks clinic, Grand Forks, North Dakota, in the department of obstetrics and gynecology.

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Ruth Pick was graduated from German University medical school in Prague, is now a research associate, cardiovascular department, Michael Reese hospital, Chicago.

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(Continued on page 392)

This is the tenth in a series of letters to Dr. J. A. Myers and the readers of the Journal-Lancet *from Dr. Ancel Keys, director of the laboratory of physiological hygiene at the University of Minnesota, during a year of study and travel abroad. Other letters will follow in subsequent issues.*

Notes from a Medical Journey

20 June 1952
Instituto de Investigaciones Medicas, Facultad de Medicina
Ciudad Universitaria, Madrid, Espana

Dear Jay:

The past month has gone in the unaccountable way of time in a busy and agreeable life. Mondays, Wednesdays and Fridays with subjects at the Municipal Clinic of Vallecas (a poor district of Madrid), getting back to the Institute of Medical Research at nine p.m. to separate serum and get ready for the analytical work of Tuesdays, Thursdays and Saturdays. And most of the evenings -- if you can call it that after sitting down to supper at ten p.m. or later -- are devoted to calculation or writing. We have learned to be reasonably fast at complex statistical analyses without a computing machine; we code everything and fortunately Margaret is pretty accurate in arithmetic.

In between things we manage to appreciate briefly the brilliant sunshine, the balmy nights and the fresh breezes that characterize Madrid at this time of the year. Now and then we take a random drive or walk and stop for an hour over a glass of sherry at one of the innumerable sidewalk and parkside cafes. We made one break of a week, touring through Andalusia -- Cordova, Seville, Jerez (where all the sherry comes from), Cadiz, Malaga and Granada. I vaguely thought of visiting people in several medical schools along the way but the countryside, the towns and the people in the streets were too absorbing to allow thoughts of serious business and professional calls. We did look up my friend Dr. Jose Villar who gave us a grand time in Cadiz where he is both professor of physiology and one of the city's leading internists.

Cadiz is not one of the best of the nine medical schools in Spain but it is typical in the common handicaps of an over-large and ill-prepared student body, a faculty almost wholly dependent for personal income on private practice, no modern library and only microscopic research funds. It is too bad, but I fear the above description might apply to almost all of the medical schools of Spain, Italy, Portugal, and France. The marvel is that some of the professors are very good at their over-burdened jobs and that they turn out a fair number of able practitioners. Like almost everything else in Spain, the extremes in doctors are far apart and there are not enough men here like Dr. Jimenez Diaz (professor of medicine and director of the Institute) and his associates Drs. Vivanco, Grande, Minon and the others I see daily. Aside from Madrid and Barcelona, there is very little real research activity in Spain.

Anyway, we have gotten through a great deal of work on the cholesterol problem and the final laboratory work, completed day before yesterday, brought the total to 165 persons studied. We had 54 men and 55 women at Vallecas, all clinically healthy in the ordinary sense but most of them definitely underfed and all on diets low in fats and animal proteins. For comparison we had 55 doctors and medical students who covered the same age range as the Vallecas group -- 18 to 55 years. Of course a lot of statistical work remains to be done but it is already clear that the findings are of great interest; you may even share my view that they are highly important.

To begin with, in regard to serum cholesterol the men of the professional class here (i.e. the doctors) are substantially the same as their counterparts in Minnesota; they have the same general level at equal age and the same marked increase with advancing age. Their diets also seem to be similar in total fats and proteins. They use much less milk and cream but olive oil replaces the customary fats consumed at home (i.e. in Minnesota). The Vallecas diets are greatly different, of course, and real caloric inadequacy is common. However, the younger Vallecas men -- 20 to 35 years of age -- are not greatly different in regard to serum cholesterol, the average values being slightly lower but the age trend is just as marked as in the doctors or in our Minnesota men. But this is only to the middle thirties and at older ages the serum cholesterol falls steadily. At age 35 the average for Vallecas is roughly 5 mg. (per 100 ml. of serum) lower than in the doctors, but at age 45 the difference is 36 mg. and at age 50 it is about 55 mg.! These Vallecas men show, in more marked degree, the same peculiarity we found in the poor men in Naples -- no great difference from the Minnesota "normals" until the thirties but thereafter an increasing difference.

I have no doubt at all that these differences in cholesterol metabolism are associated with important differences in the incidence of coronary disease but again, as at Naples, we have no real data on morbidity and mortality to document the argument. Here, as in Naples, general opinion has it that coronary disease is much more common among the rich than the poor people. In any case, here is a solid set of facts showing a marked difference in the age trend of something we can measure and it is unquestionably associated with differences in diet which we also can measure. I think this is something new in the embryonic science of the quantitative study of later ontogeny of man.

You will understand that I am properly elated and that I shall emphasize these results in my address at Amsterdam on July 9th. I have just received the final programs of the Dutch meetings and I find that I am allotted an hour and a half before the Joint Session of the International Congresses on Diabetes and on Dietetics. So I must get busy to prepare for the occasion. Some of the slides can be used for forthcoming lectures this fall in Chicago and New York as well as in Minneapolis.

Next week we set off in the car for a long detour through Galicia and the Basque country before heading for Holland where we shall see many old friends and, I imagine, lose a lot of sleep. Then across to England, where Caroline and Henry still flourish, apparently, and only a couple of weeks later we start on the long-promised tour to Scandinavia with the children. And no more lectures to prepare and deliver until we are back home in September! So you may expect my next from England. In the meantime, all the best to you and our good friends at home!

As ever,

Ancel Keys

BOOK REVIEWS

Help Yourself Get Well. A Guide for TB Patients and Their Families, by Marjorie McDonald Pyle, M.D. Foreword by H. Corwin Hinshaw, M.D., 1951. 235 pages. New York: Appleton-Century-Crofts, Inc. $3.00.

A physician's ability to treat a chronic disease and advise others is tremendously enhanced when he has been ill from the disease and has overcome it. No amount of schooling or medical practice can substitute for the knowledge thus gained. A physician who has had such an experience investigates deeper into the disease, makes keener observations and acquires a better store of information than others. He knows the patient's psychology and discusses procedures so understandingly that confidence is nearly always assured and that all-important physician-patient-family relationship, is established. This often means the winning of half or more of the patient's battle against the disease.

These are some of the reasons that Dr. Marjorie Pyle was the perfect author for *Help Yourself Get Well*. While writing this volume she herself was well on the road to recovery from her third bout with clinical tuberculosis. She has also been a close student of tuberculosis in its various aspects for a decade. Scholastically she headed her medical school class, proceeded with a postgraduate fellowship in internal medicine, and served as assistant medical director in an outstanding tuberculosis sanatorium. She did a large volume of scientific research in experimental tuberculosis and cooperated in the publication of numerous medical articles on such subjects as chemotherapy in tuberculosis.

Help Yourself Get Well was written primarily for tuberculous patients and their families. No matter how expert the attending physician, there is much that the patient and the family must do to insure recovery. Dr. Pyle has helped many persons get well from tuberculosis; she knows how essential it is for the patient and the family to cooperate with the physician in every detail. Her book contains all the fundamental information that any patient and family needs to do their part in achieving the goal.

J.A.M.

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Special Vector Electrocardiography: Clinical Electrocardiographic Interpretation, by Robert P. Grant, M.D., National Heart Institute, Bethesda, Maryland and E. Harvey Estes, Jr., M.D., U. S. Naval Hospital, Bethesda, Maryland, 1951, Philadelphia: The Blakiston Company. 149 pages, $4.50.

The use of vector methods in electrocardiography is not new although it is only in the last decade that a renewed interest has been taken in the subject of vectorcardiography.

The authors' object in this volume is to indicate how vector principles can be applied in the clinical interpretation of the electrocardiogram.

The book is divided into two parts: Part I discusses the spatial vector method of interpretation; Part II takes up the clinical application of the spatial vector method. It is not a textbook of clinical electrocardiography as only the ventricular electrocardiogram is considered. For those interested in learning more about vector methods in electrocardiography the work should be of popular interest.

•

T.Z.

CEREBRAL MECHANISMS IN BEHAVIOR, The Hixon Symposium, edited by Lloyd A. Jeffress. New York: John Wiley and Sons, Inc., 1951. 309 pages. $6.50.

This book is composed of a compilation of papers given at a symposium held at the California Institute of Technology under the auspices of the Hixon Fund Committee. The papers included were presented by some of the foremost leaders in the fields of psychology, philosophy, biology, physiology, and mathematics. The material in this small volume is highly speculative, but very challenging to anyone interested in the study of the nervous system. Because of the nature of the material which deals primarily with certain phases of neurophysiology, this book is very difficult to read. The material must be considered carefully, and many parts will have to be reread many times before completely comprehended.

This volume is recommended only to the specialist in the field of the nervous system who should peruse its pages when adequate leisure time is available for meditation.

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News Briefs . . .

Among the research grants awarded recently by the United States public health service were four to the University of Minnesota, one to Concordia college, Moorhead, one to the University of North Dakota.

The University of Minnesota grants were:

Dr. Ernest Gellhorn, $9,180, to study the influence of heat and cold on the central nervous system.

Edwin L. Schmidt, $3,953, to study the relation between an infant's disease attributed to drinking water high in nitrate content and the fertilization of the soil.

Dr. A. F. Sellers, $4,870, to study kidney function.

Dr. Richard L. Varco, $10,968, for studies on the influence of alterations in carbon dioxide concentration during anesthesia.

At Concordia, Dr. Richard G. Werth received a $216 grant to make a synthesis of carcinogenic hydrocarbons. Dr. W. E. Cornatzer, University of North Dakota school of medicine, also received a grant of $9,450.

* * *

Five new health and hospital projects have been authorized for construction in the upper Midwest region by the United States public health service. These include a county hospital at Perry, and a state school at Glenwood, both in Iowa; a community hospital at Livingston, Montana; the Atkinson clinic in Milwaukee, and Sauk County hospital in Reedsburg, Wisconsin.

North Dakota

Dedication ceremonies for the new $750,000 wing of the Bismarck hospital were held on June 2. Features of the new wing, which accommodates about 80 patients are oxygen lines to all rooms and an intercommunication system for contact of patients and staff.

* * *

Dr. M. G. Flath, Stanley, was honored at the dedication ceremonies of the Community hospital on June 12 for the 41 years he has practiced at Stanley.

* * *

Directors of the Leeds health center sponsored a linen shower on July 8 to provide needed supplies for the new Leeds clinic which will open shortly. Dr. Frank G. White, formerly of Omaha, will be the director of the clinic.

* * *

New Locations and Appointments . . . .

Dr. F. D. Peterkin, a graduate 1952 of the University of Manitoba medical school, will practice medicine with Dr. V. A. Mulligan in Langdon.

* * *

Dr. R. S. Woodward of the DePuy Sorkness clinic in Jamestown has been appointed Stutsman county coroner.

* * *

Dr. Charles R. Lambert, a graduate of University of Louisville medical school, who has practiced in Kentucky and South Dakota, has joined the staff of the Missouri Valley Clinic in Bismarck.

* * *

Dr. Miles V. Smith, formerly a ward surgeon with the Minot Veterans hospital, has been transferred to the veterans administration hospital at Milwaukee, Wisconsin.

* * *

Dr. Ellis Oster, formerly of Fargo, has opened a practice in Ellendale.

Minnesota

Dr. Edward H. Rynearson, of the Mayo clinic in Rochester, received an honorary doctor of science degree on June 9 from Ohio Wesleyan university.

* * *

A subculture of Fleming's original penicillin mold was brought home in May to Minneapolis by Dr. Fred W. Wittich from the Paris meeting marking the 50th anniversary of the discovery of anaphylaxis. Dr. Wittich is president of the International Association of Allergology.

* * *

Dr. Moses Barron was honored at a dinner on June 27 at the Coffman union on the campus on his retirement from the clinical staff of the University medical school.

* * *

At the annual meeting of the American College of Chest Physicians in Chicago, June 5 to 8, Murray Kornfeld, executive director of the organization was presented with a scroll in recognition of 25 years of service by Dr. J. A. Myers. Dr. Myers, chairman of the Journal-Lancet board of editors, is editor in chief of the college journal, *Diseases of the Chest*, and a past president of the college. At the same meeting Dr. C. Walter Lillehei of the University of Minnesota department of surgery, was presented the essay award, including a prize of $250, for his essay "Experimental Bacterial Endocarditis and Proliferative Glomerulonephritis."

* * *

New Locations . . . .

Following a five year postgraduate training in surgery, Dr. Roy W. Dickman has opened an office for the practice of surgery in Minneapolis.

* * *

Dr. John Reitmann, superintendent of the Sandstone State hospital, has resigned to continue psychiatric training at Rochester State hospital.

* * *

Dr. Charles D. May of the University of Minnesota pediatrics department, has been named head of the department of pediatrics at the University of Iowa. Dr. Forrest Adams, also of the pediatrics department, will join the pediatrics staff at the University of California at Los Angeles.

* * *

Dr. Franklin H. Top, professor in public health, will head the department of preventive medicine at the University of Iowa.

* * *

Dr. Robert Huseby, also of the University of Minnesota, has accepted a position at the University of Colorado at Denver.

* * *

Dr. and Mrs. William Heneka, both of whom have just completed internship at Northwestern hospital in Minneapolis, will open an office in Pequot Lakes.

South Dakota

Dr. H. F. Hansen, who has practiced medicine in Vermillion for several years, has been appointed to the staff of the Royal C. Johnson Veterans hospital in Sioux Falls. He will assume his new post on September 1.

* * *

Dr. E. R. Crow, formerly with the Minnesota State Sanatorium at Walker, has been appointed chief of tubercular service at the Hot Springs Veterans Administration Center hospital.

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- Surgical Anatomy and Clinical Surgery, Two Weeks, starting September 22, November 3.
- Surgery of Colon and Rectum, One Week, starting September 15.
- Gallbladder Surgery, Ten Hours, starting October 20.
- Basic Principles in General Surgery, Two Weeks, starting September 8.
- General Surgery, One Week, starting October 6.
- General Surgery, Two Weeks, starting October 6.
- Breast and Thyroid Surgery, One Week, starting October 6.
- Esophageal Surgery, One Week, starting October 13.
- Thoracic Surgery, One Week, starting October 20.
- Fractures and Traumatic Surgery, Two Weeks, starting October 6.

GYNECOLOGY Intensive Course, Two Weeks, starting September 8, October 20. — Vaginal Approach to Pelvic Surgery, One Week, starting September 22, November 3.

OBSTETRICS — Intensive Course, Two Weeks, starting September 29, November 3.

MEDICINE— Electrocardiography and Heart Disease, Two Weeks, starting September 29. — Intensive General Course, Two Weeks, starting October 13.
Gastroscopy and Gastroenterology, Two Weeks, starting September 15, November 3.

UROLOGY—Intensive Course, Two Weeks, starting September 8. — Cystoscopy, Ten Days, starting every two weeks.

DERMATOLOGY—Intensive Course, Two Weeks, starting October 13.

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Deaths . . .

DR. HENRY G. HENRIKSEN, 82, Northfield, Minnesota, died on March 30. Dr. Henriksen was a graduate of Bennet (now Loyola) Medical school, Chicago, in 1910.

* * *

DR. A'ENEAS MACDONALD, 76, Minneapolis, Minnesota, died on April 11. Born at Vankleek, Hill, Canada, Dr. Macdonald was graduated from Queens University medical school in 1901 and had practiced in Minneapolis for thirty-five years.

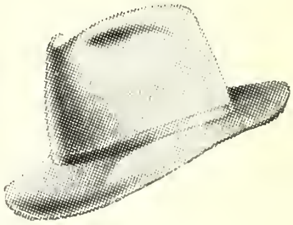
* * *

DR. A. A. CHARPENTIER, 77, St. Paul, Minnesota, chief deputy coroner of Ramsey county, died April 12 at Ancker hospital.

* * *

DR. P. J. CRESS, about 70, formerly of Ellsworth, Minnesota, died unexpectedly on May 30 while traveling in Europe. Dr. Cress practiced medicine in Ellsworth from 1911 until eight years ago when he moved to Marysville, California.

(Continued on page 388)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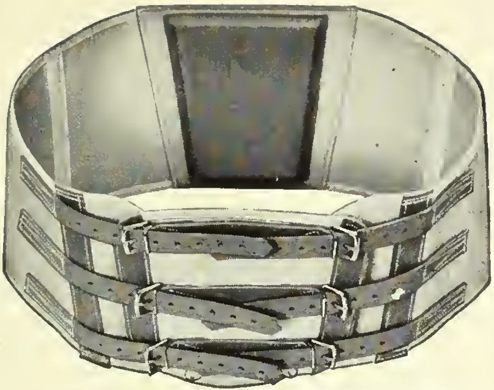

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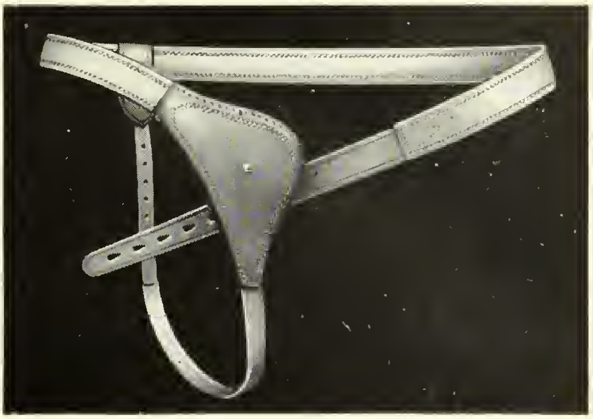

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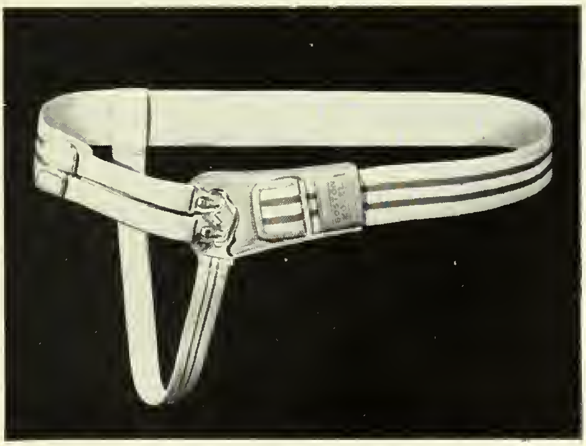

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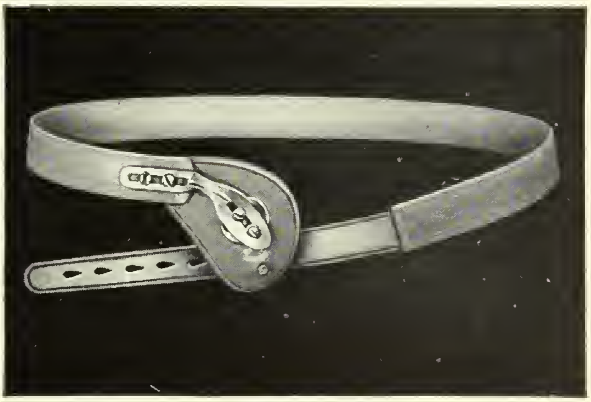

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(Continued from page 386)

Dr. Donald Slaughter, former dean of the University of South Dakota school of medicine at Vermillion, died on Friday, June 6. A graduate of the University of Iowa medical school, Dr. Slaughter had taught at that school, Baylor university, University of Vermont, and Southwestern medical college.

* * *

Dr. Christopher Grapham, 96, only surviving member of the original partnership which grew into the Mayo clinic, died at Rochester, Minnesota, on June 20. Dr. Grapham was graduated from the University of Minnesota, received his M.D. in 1894, served as professor of medicine in the Mayo Foundation and as head of the division of medicine before his retirement in 1919.

OBSERVATIONS AND THERAPY OF PEPTIC ULCER IN YOUNG ADULTS

(Continued from page 363)

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A PRACTICAL SCHEME FOR THE TREATMENT OF URINARY TRACT INFECTIONS

(Continued from page 356)

patient with a badly battered urinary tract has kept his urine clear for two years with a single capsule of Aureomycin per day.

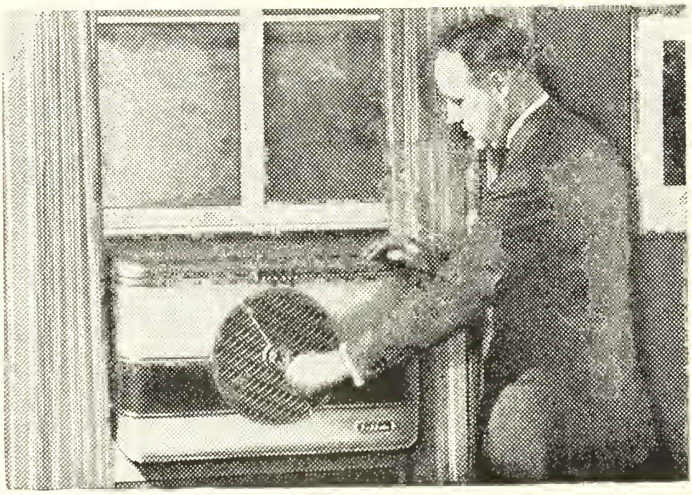
SUMMARY AND CONCLUSIONS

Mild infections of the urinary tract are often best treated, at least at first, with some of the less expensive and less toxic agents such as sulfadiazine, Gantrisin, or calcium mandelate, resorting to the more costly and toxic agents after the others have failed.

Severe acute infections should be hit hard with one or a combination of wide spectrum agents while cultures and sensitivity tests are being done.

Resistant acute, recurrent acute, and chronic infections require thorough investigation which should include: measurement of the residual urine, investigation of the prostate for active infection, urography to exclude infected hydronephrosis, renal and perirenal abscesses, stones and tuberculosis; cystourethroscopy and retrograde pyelography to supplement the findings on urography; and cultures and sensitivity tests to

(Continued on page 390)



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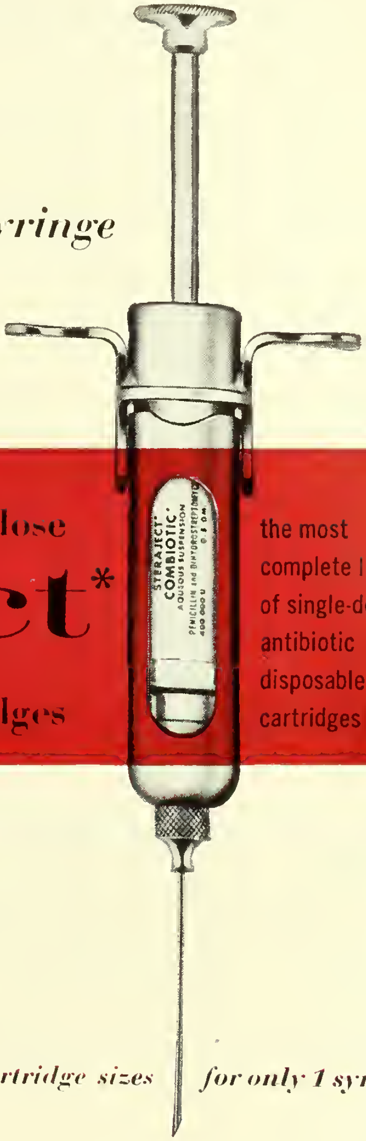

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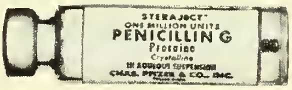

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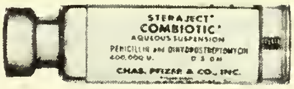

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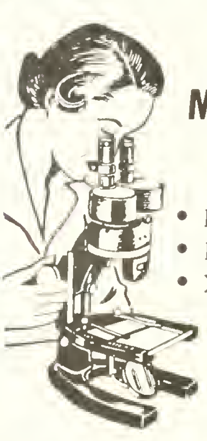

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A PRACTICAL SCHEME FOR THE TREATMENT OF URINARY TRACT INFECTIONS

(Continued from page 388)

aid in the choice of antiseptics and antibiotics.

It is important not to stop treatment as soon as the urine clears, lest bacteria capable of reproducing the infection at a later date be left behind.

EXPERIMENTAL ATHEROSCLEROSIS

(Continued from page 376)

clearly indicate that lipotropic factors are incapable of influencing the hypercholesterolemia of essential xanthomatosis. Further, they do not affect the level of *Sf* 12-20 molecules in the plasma. Pending further large scale, carefully controlled clinical investigation, therefore, little justification can be found for the extensive use of these costly materials in atherosclerotic humans.

CONCLUSION

In conclusion it may be reiterated that a basic proposition is the foundation of the work of this department on experimental atherosclerosis. The essence of this proposition is that altered cholesterol metabolism plays a key role in human atherogenesis. The corollary of this proposition is that the study of experimental atherosclerosis (particularly experimentally cholesterol-induced atherosclerosis) – and of the exogenous and endogenous factors influencing it – yields knowledge of fundamental significance for understanding human atherosclerosis. Certainly, present knowledge does not permit us to state that the atherosclerosis problem has been solved by research along these lines. Certainly much remains to be done before a solution is reached. However, it is justified to state that the progress made in recent years is proof positive of the validity of the general framework of reference in which the research assault on the atherosclerosis problem is proceeding. Within this frame work of reference, we predict lies the solution of the atherosclerosis problem, and with it the prevention, control and eventual elimination of this malevolent disease.

Acknowledgment: This report is based on the work of a large team which over the last ten years has included Drs. L. C. Akman, S. A. Carlen, D. V. Dauber, M. Feldman, Jr., G. Gros, R. Harris, L. Horlick, M. Hurwitz, M. Lowenthal, R. S. Megibow, A. J. Miller, A. Sanders, J. G. Schlichter and E. N. Silber and the following technicians: L. Adams, E. Arnold, C. Bolene, G. Crowley, M. Dudley, W. Foote, L. Friedberg, L. Havel, P. Johnson, E. Levinson and J. Meyer.

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[1] The reader is referred to the forthcoming review from the department for a complete bibliography: Katz, L. N., and Stamler, J.: Experimental Atherosclerosis. Springfield, Charles C Thomas. In press.

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DIAGNOSTIC CRITERIA FOR CORONARY ARTERIOSCLEROTIC DISEASE

(Continued from page 369)

DIFFERENTIAL DIAGNOSIS OF CORONARY ARTERIOSCLEROTIC HEART DISEASE

I. Cardiovascular Conditions

1. Acute fibrinous pericarditis
2. Syphilitic aortitis
3. Arrhythmias, especially paroxysmal supraventricular tachycardia, auricular fibrillation and auricular flutter
4. Aortic stenosis (rheumatic or calcific)
5. Dissecting aneurysm
6. Sudden death
7. Other conditions: Dissecting aneurysm; acute rheumatic arteritis; coronary embolism; anemia; thromboangiitis obliterans of the coronary arteries; ruptured aortic valve; periarteritis nodosa; giant cell arteritis of the coronary arteries; carcinoma of the pericardium and/or myocardium (usually metastatic)

II. Extracardiac Conditions

1. Anxiety states
2. Neurocirculatory asthenia
3. Intercostal neuralgia
4. Neurologic conditions: Cervical rib; precordial migraine; scalenus anticus syndrome; root pain from any cause; rupture cervical disc
5. Acute fibrinous pleurisy
6. Pneumonia with pleural involvement
7. Acute gastritis
8. Conditions involving the esophagus: Diaphragmatic hernia; diverticulum; esophagitis; carcinoma; esophageal spasm
9. Pulmonary embolism
10. Subdiaphragmatic conditions: Gallstone colic; ruptured duodenal ulcer; acute pancreatitis
11. Rare conditions: Metastatic carcinoma of the sternum or chest wall; aortic aneurysm eroding the chest wall; mediastinal emphysema; diaphragmatic flutter; pectoralis minor syndrome; hemorrhage into the sternum (as in blood dyscrasias); fractured costal cartilage (as from coughing)
12. Sudden death

MEET OUR CONTRIBUTORS

(Continued from page 388)

Maurice B. Visscher was graduated from the University of Minnesota medical school, where he is professor and head of the department of physiology. He holds membership in numerous societies, is editor of Chemistry and Medicine and assistant editor of several journals.

★

Wallace Mason Yater received his medical degree from Georgetown University in 1921, where he has served as professor and director of the department of medicine, and as head of the department of medicine of Georgetown University hospital. He is a regent of the American College of Physicians, and has been editor of the Medical Annals of the District of Columbia since 1932.

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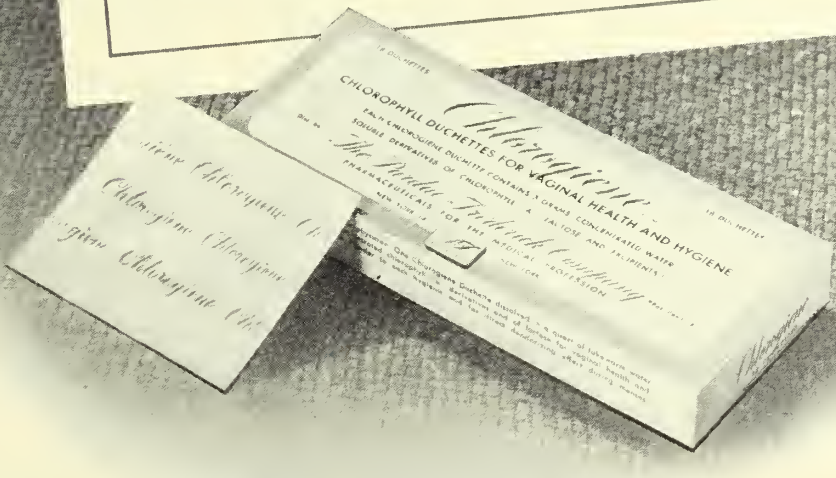
(1) Council on Pharmacy and Chemistry: New and Non-Official Remedies, J.A.M.A., 146:34, 1951. (2) Severinsson, I.: Chlorophyll, Svenska Lakartidninger, 48,49:2939, 1951. (3) Klein, L. L.: To be published. (4) Resnik, E. D.: Personal Communication.



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European Society of Cardiovascular Surgery, Strasbourg, France, Oct. 3-4. Sir James Learmonth, Department of Surgery, University New Buildings, Edinburgh 8, Scotland.

Inter-american Congress of Radiology, Mexico City, Mexico, Nov. 2-8. Dr. Guido Torres Martinez, Marsella No. 11, Mexico, D.F., Secretary-General.

International Congress on Diseases of the Chest, Rio de Janeiro, Brazil, Aug. 24-30. Mr. Murray Kornfeld, 112 East Chestnut St., Chicago 11, Illinois, Executive Secretary.

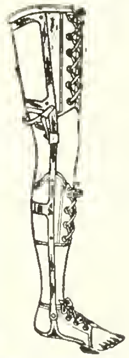
International Congress of Haematology, Mar del Plata, Argentina, Sept. 21-26. Dr. Carlos Reussi, Anchorena 1710, Buenos Aires, Argentina, Secretary.

International Congress of Internal Medicine, Friends House, London, N.W.1, Eng., Sept. 15-18. Sir Harold Boldero, 12 Pall Mall East, London, S.W.1, England, Secretary.

International Congress of Urology, The Waldorf-Astoria, New York, N. Y., U. S. A., Sept. 15-18. Dr. John A. Taylor, 2 East 54th St., New York, N. Y., U. S. A., Secretary-General.

International Union Against Tuberculosis, Rio de Janeiro, Brazil, Aug. 24-27. Prof. Etienne Bernard, 66 Blvd. St. Michel, Paris 6e, France, Secy.-General.

Interamerican Cardiological Congress, Buenos Aires, Argentina, Aug. 31-Sept. 7. Dr. Blas Moia, Larrea 1132, Buenos Aires, Argentina, Secretary-General.



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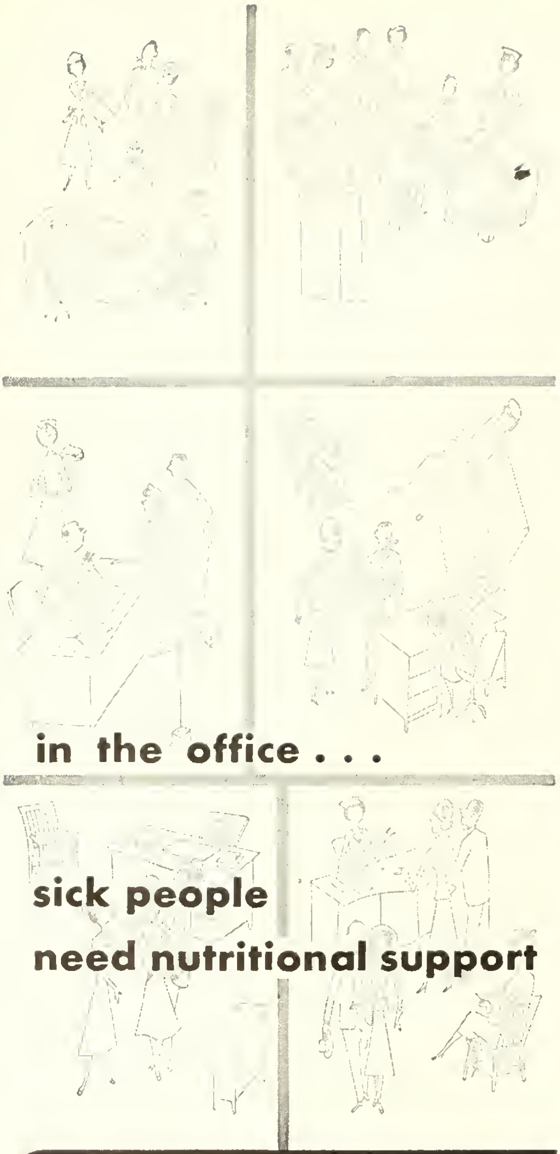

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American College Health Association News

A WELCOME is extended to two new members of the association:

Nebraska State Teachers College, Kearney, Nebraska, with an enrollment of 348 men and 288 women. Mrs. Alta V. Bergquist, R.N., is the director of student health. Leland Copeland, the health educator, and a part time physician complete the staff. The services of the city sanitarian and the state public health sanitarian are used.

Wittenberg College, Springfield, Ohio, with an enrollment of 551 men and 428 women. Members of the health service staff include Mrs. Rena E. Coppess, R.N., Mr. Frank White, chairman of the health committee, Mr. Ralph Ness, health educator and head of the department of health and physical education, a secretary, and an attendant for Men's Infirmary.

* * *

DR. JAROSLAW SACHNO is the new Director of Student Health at Champlain College, Plattsburg, New York. Dr. Sachno replaces Dr. William W. Johnson.

* * *

MISS HELEN ELIZABETH GIFFONS, Staff Member of the College Student Health Service at Western Michigan College, Kalamazoo, Michigan, completed a Master's Degree in Health Education at the School of Public Health, University of Michigan, in June 1952.

* * *

DOCTORS THELMA *and* HANS KR. HILBERG have completed a year's experience in the Health Service at the University of Kansas under the direction of Dr. Ralph I. Canuteson. They returned to Norway in August to resume their practice at Hamar Hospital, where Dr. Thelma Hilberg does general medicine and Dr. Hans Kr. Hilberg, surgery.

* * *

CHARLES L. MAXWELL, M.D., formerly director of the Student Health Service at Eastern Illinois State College, Charleston, is now deputy director of civil defense in charge of health services in Illinois.

* * *

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* * *

DR. E. HERNDON HUDSON, Ohio University, has returned from his WHO project in Iraq. Dr. Hudson left Iraq in June 1951, and spent the summer in Scotland, returning to Ohio University last September. He was director of the project "Bejel" and is now planning to get out a monograph on bejel this coming school year.

* * *

MISS MARY D. BURR, Director of Health Service, Wagner College, Staten Island, New York, reports that special efforts have been directed to a better follow-up of the pre-entrance physical examination. The majority of the students and faculty take advantage of the free x-rays which are provided each year with the cooperation of the local Tuberculosis Committee. The x-ray is required of all food handlers and students enrolled in the School of Nursing.

WILLIAM A. STEBBINS, Director of Student Health Service, The State Teachers College at Brockport, New York, reports that all students receive an annual physical examination, and all athletes are examined prior to participation in sports. The college physician examines at the rate of about four students per hour. About 1,000 students are insured under a student health and accident insurance plan. Ninety per cent of the students are x-rayed during the five days a mobile x-ray unit is on the campus. Complete accident records have been kept for the past four years. These accident facts have been the basis of the program in accident prevention. The accident rate has been reduced by 50 per cent.

* * *

IN ORIENTATION WEEK new students at the University of Kansas are offered an opportunity to have a conducted tour of the Health Service and Watkins Memorial Hospital. In previous years these tours were limited to the library, but as a means of acquainting the new students with the many facets of University activities, they will be extended to cover laboratories, hospitals, museums, and other places of interest.

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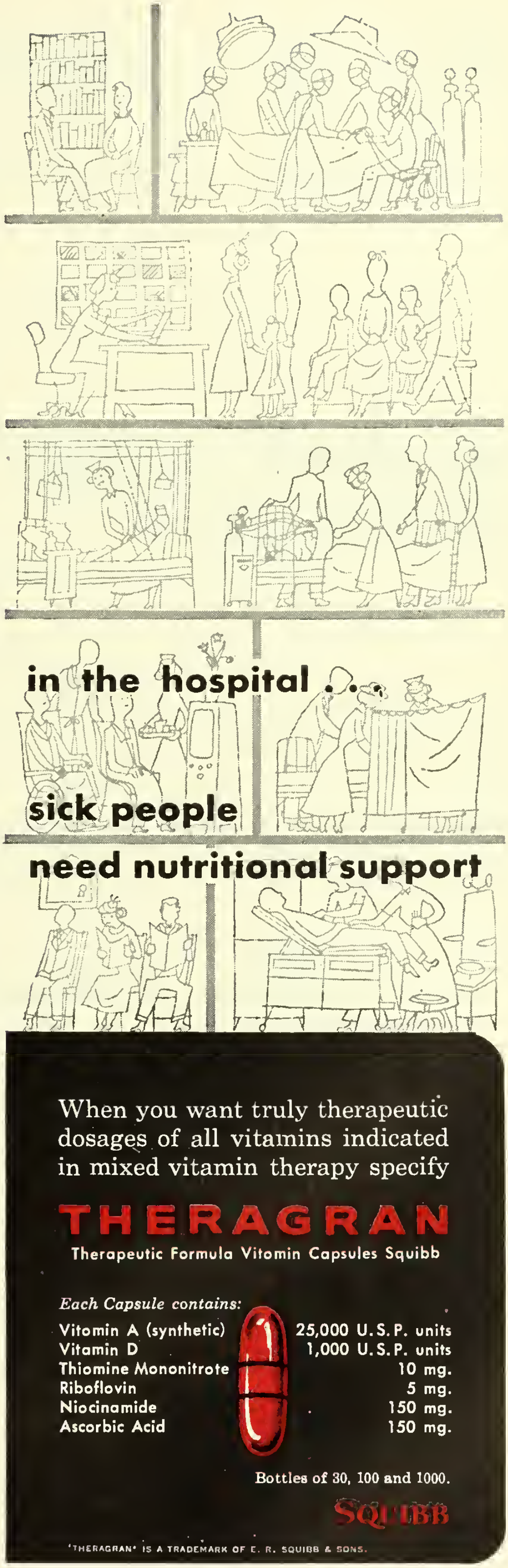

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Collagen Diseases*

GROVER D. ICENOGLE, M.D.
Bismarck, North Dakota

THE TERM collagen diseases is being used more and more in literature and in clinical discussions. This has come about mainly as a result of emphasis placed upon the collagen system as the site of significant pathology of lupus erythematosus, especially the disseminated form. This is the underlying pathology found in all the organs whether it be the heart, kidneys or skin. Other like diseases are periarteritis nodosa, rheumatic fever, scleroderma, dermatomyositis and rheumatoid arthritis. Klemperer, who popularized the use of the term collagen diseases emphasizes that it may be a poor one and perhaps should not be used. The various diseases that are now ordinarily included in the group of collagen diseases may be entirely separate as far as etiology, and they are certainly different as far as treatment, prognosis and morbidity are concerned.

As expressed by Klemperer, the term collagen system implies that the fiber forming connective tissue is composed of cells and intercellular substance. The latter consists of fibers and a homogeneous ground substance. Upon boiling with water, connective tissue yields a colloidal solution of animal glue or gelatin. Thus, the term collagen tissue or collagenous tissue is synonymous for connective tissue. Collagen is derived entirely from the intercellular component of the connective tissue, and will, therefore, apply to the intercellular substance. In view of the emphasis on cellular metabolism, the stimulus for study provided in this line by the use of ACTH and cortisone, and the tremendous amount of work in cellular chemistry valuable sources for study and research in early diagnosis of collagen diseases are provided. Originally, the connective tissue was considered mainly a supportive structure of mechanical function only. Water and salt balance and the transference of metabolites from the blood to the parenchymal cells may also be attributed to this connective tissue.

If considered in the differential diagnosis, the clinical diagnosis of a disseminated lupus erythematosus can often be made. The typical skin lesion usually recognized may first appear on the face in a butterfly distribution across the bridge of the nose; thereafter spreading to the neck, chest and extremities. This erythematosus lesion is apt to be dusky and slightly indurated. Aggravation by sunlight is an additional help in diagnosis but may be disastrous for the patient if it initiates a fulminating course. As a rule the disease has a prolonged febrile course characterized by acute exacerbations and remissions.

GROVER D. ICENOGLE, *a graduate of the University of of Illinois medical school, specializes in internal medicine in Bismarck. He is a fellow of the A.M.A., an associate of the A.C.P., and a member of the American Society of Tropical Medicine and Hygiene.*

*From the department of internal medicine of the Quain and Ramstad Clinic, Bismarck, North Dakota.

Over 80 per cent of the cases occur in women, usually in the younger age group, especially before the menopause. Further systemic symptoms include tachycardia, weakness and prostration. Local symptoms of arthritis and inflammation of the serous membranes with effusion are the rule. Five per cent of the patients will show fingertip changes. The laboratory findings may give the first clue. Evidence of nephritis is manifested by the presence of albumin, red blood cells, and casts in the urine. Nitrogen retention in the blood will ultimately be present. These findings exist in the presence of a normal blood pressure. "Wire loop" lesions, characterized by hyaline thickening of the subendothelial layers of the capillary walls of the glomerulus are found along with focal glomerulonephritis. All the formed elements of the blood are suppressed resulting in a rather severe anemia. Leukopenia represents an absolute reduction of polymorphonuclear leukocytes. The sedimentation rate is universally elevated. Serology is positive in about 35 per cent of the cases. Blood ascorbic acid is universally low which is interesting from the point of view of chemistry of the collagen system. The total protein is normal or elevated, but retains its normality by a high gamma globulin which is of special interest in regard to the L.E. factor mentioned later.

Cordas has described fundi changes consisting of exudates, cotton wool patches, hemorrhages and ultimately papilledema. Subjective eye symptoms are uncommon. The central nervous system may be affected, manifesting such symptoms as changes in personality, delirium, convulsions and coma. Libman and Sachs have shown valvular changes in the heart, characteristic of the disease. However, murmurs are not always present, and if present, are inconstant. The electrocardiogram may show variation from the normal. P-R interval elongation is common. The occurrence of lymphadenopathy shows congestion and necrosis of the germinal centers as described by Mallory. The patient may have so many of the above symptoms and findings that no other diagnosis except lupus erythematosus is plausible. However, without the characteristic skin lesion, a positive clinical diagnosis is difficult until the L.E. cell is discovered. Disseminated lupus erythematosus is supposed to be a fairly rare disease, especially without the skin component. The six cases shown in table I had no skin lesion at the time of the diagnosis. Initially, two cases presented a problem of pleural effusion and were diagnostic problems, especially in ruling out tuberculosis. Two others were thought to have rheumatoid arthritis. Obviously, the earlier acute disseminated lupus erythematosus is diagnosed, the more properly the case can be handled, the family satisfied, and unnecessary expense to the patient avoided.

Periarteritis nodosa presents a clinical picture of a prolonged, febrile disease. In 75 per cent of the cases it is found in the male. Here again, as in lupus erythematosus, spontaneous remissions are frequent and recovery occurs in approximately 10 per cent of the cases. The presenting systemic symptoms are usually those of

TABLE I

Case	Sex	Age when first seen	Early Manifestations	Later Manifestations	Duration	Serology	L.E. cell study	Presence of typical skin lesion	Date of Death	Age at Death	Autopsy
1	F	44	Rheumatoid arthritis	Pleural effusion, nephritis	6 years	0	Found September 1947	None	October 1948	46	Refused
2	F	15	Amenorrhea	Rheumatoid arthritis, debility	December 1946	0	Found September 1947	None	Living	Living	
3	F	17	Rheumatoid arthirtis	Adenopathy, debility	9 months	0	Found January 1948	One month before death	September 1948	17	Refused
4	F	24	Chest pain, pleural effusion	Painful fingers, rheumatoid arthritis	3½ years	0	Absent November 1949	Six months before death	November 1949	28	Disseminated lupus erythematosus
5	F	9	Rheumatoid arthritis	Fever, spenomegaly, pericarditis, endocarditis	10 months	+	Found July 1949	Suggestive one month before death	November 1949	9	Refused
6	F	27	Debility, questionable butterfly skin lesion	Nephritis, pleural effusion	9 months	0	Suggestive but not typical March 1951	Suggestive in July 1950 by history	March 1951	27	Disseminated lupus erythematosus

malaise, fever and weakness. Local symptoms depend upon the site and degree of involvement of the arteries. The kidney is involved in most of the cases, showing hematuria and albuminuria. Uremia is a common cause of death. Hypertension may develop quite suddenly in over half of the cases. The heart may manifest arrhythmias and mild congestive failure. The electrocardiogram will reflect these changes. About one-third of the patients will develop symptoms which are a mimesis of the surgical abdomen. An infarct in the bowel will occasionally be followed by a perforation. The nervous system, if involved, may simulate multiple sclerosis or neoplasm. The skin may have cutaneous nodules. Laboratory findings in periarteritis nodosa show an anemia and leukocytosis in 35 per cent of the cases, with eosinophilia in only a little over 10 per cent. A definite diagnosis is usually made histologically, showing a patchy, inflammatory lesion involving the three coats of the artery and necrosis of the media.

Klemperer points out that acute rheumatic fever is also distinguished by systemic involvement of the collagenous tissue, but that the association of a specific Aschoff nodule with fibrinoid collagen changes and the absence of the characteristic renal and splenic lesions serve to separate it as a disease anatomically. It is certainly different on clinical grounds from disseminated lupus erythematosus. In scleroderma and dermatomyositis the collagen changes are again more localized. In the latter, degenerative changes are usually marked in the muscles and are more pronounced than those ever found in lupus erythematosis. Rheumatoid arthritis also demonstrates a great deal of collagen degeneration in addition to the bone pathology and is often included in this group of diseases. It, likewise, has an unknown etiology. Rheumatoid arthritis may be confused with disseminated lupus erythematosus without skin changes.

The L.E. cell, found in the bone marrow shows a compressed neutrophil nucleus, the greater bulk of the cell being filled with an amorphous, purple staining material which looks much like a faintly staining lymphocyte nucleus. Thus, it would appear that the L.E. cell is the result of a lytic and phagocytic phenomenon. The L.E. cell is practically always a mature neutrophilic polymorphonuclear leukocyte. The chromatin material seen in it is within a large phagocytic vacuole, and all gradations of digestion of the material have been observed. Most of these cells characteristically show a homogeneous, purple staining mass in the vacuole. There are other instances where the chromatin pattern is still visible. The verification is accomplished by looking at numerous L.E. cells in the process of digestion in order to be sure about them (figures 1 and 2).

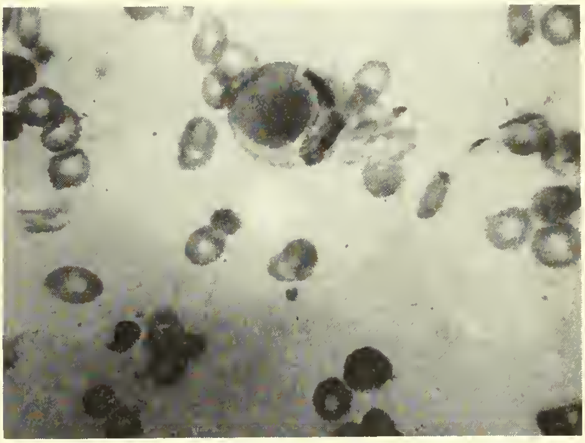
Fig. 1. Typical L.E. cell showing compressed neutrophilic nucleus.

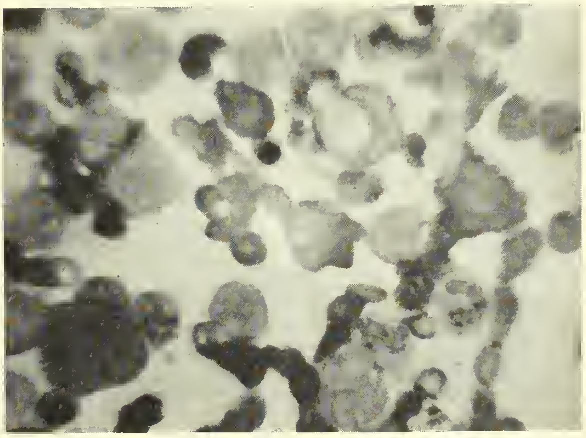
Fig. 2. L.E. cell showing a socalled dumbbell pattern.

Haserick analyzed the difficulty of others in demonstrating the L.E. cell and found that by using the direct smear method of bone marrow study, L.E. cells were never found. It is necessary to let the aspirated bone marrow incubate at room temperature for awhile before smearing. Hargraves, in April 1949, published the work on the production in vitro of the L.E. phenomenon by using normal bone marrow elements and the blood plasma of patients with acute disseminated lupus erythematosus. The obvious suggestion from this was that the material responsible for the nucleolysis, agglutination and phagocytosis might well be in the plasma of patients suffering with acute disseminated erythematosus, and that the L.E. cells could be reproduced by the use of bone marrow from patients who did not have the disease. This was proven to be true by the incubation of normal myeloid layer of normal bone marrow for a short period at body temperature in plasma derived of lupus erythematosus patients. Haserick has carried this work further by producing the same changes in the peripheral blood cells by using the buffy layer of the centrifuged blood. In ten cases Haserick discovered that the blood from eight acute and subacute L.E. patients produced L.E. cells. These cases had no skin lesion. Other diseases of a chronic nature such as discoid lupus erythematosus, sarcoidosis, cirrhosis of the liver and dermatomyositis failed to produce this phenomenon.

Then, Haserick determined that the gamma globulin was the specific plasma fraction that produced this change by precipitating and separating out the other proteins. In demonstrating and producing this phenomenon, he concluded that the gamma globulin of acute disseminated lupus erythematosus contains a factor which is responsible for the formation of L.E. cells. He further showed that the L.E. factor disappears from blood during remissions and reappears during exacerbations of the disease in patients with acute lupus erythematosus. Further interesting work by Haserick and Lewis at the Cleveland Clinic resulted in using the fractionated gamma globulin from the patients wtih acute disseminated lupus erythematosus as an antigen to produce antibodies in rabbits. Antiserum was, therefore, developed in groups of rabbits by immunizing them against normal human serum and normal human gamma globulin, and also L.E. gamma globulin. After precipitation the results of adding the L.E. gamma globulin solution to the antisera developed, the supernatant fluid was studied. It was found that the L.E. phenomenon was not demonstrable after the L.E. globulin was precipitated by the anti-L.E. gamma globulin but by the anti-normal human gamma globulin rabbit serum. The phenomenon was still apparent. Thus, this strongly suggests that the L.E. factor is an immunologically distinct component of the L.E. gamma globulin. The L.E. plasma of subacute disseminated lupus erythematosus will produce this Haserick phenomenon when L.E. cells are not found in patients by the usual technic. This produces a differential diagnostic point between subacute and acute disseminated lupus erythematosus. This apparent immune reaction is of particular value in the diagnosis of lupus erythematosus where the cutaneous manifestations are absent. According to Zucker, electroencephalograms are done on all patients with lupus erythematosus which are seen at the Cleveland Clinc. Thirty per cent show abnormal brain waves; a third of these had seizures, the remainder show no clinical evidence of central nervous system involvement. Therefore, the electroencephalogram may be helpful in the diagnosis of lupus erythematosus.

SUMMARY

Collagen diseases have been discussed. The L.E. cell and its phenomenon have been reviewed. Six cases of acute disseminated lupus erythematosus are presented.

CASE REPORTS

Cases 1 and 2 were referred to the Mayo Clinic where L.E. cells were found and the diagnosis confirmed. It was at this time that Hargrave's discovery was called to our attention. This striking new development, as described above, has been utilized by us since that time. It is to be noted that all of the cases are female. All except one are dead. Age at death varied from nine to forty-six years, averaging twenty-three years. The duration of recognizable illness varied from nine months to six years. The patient designated as Case 1 delivered a normal five-pound eight-ounce baby girl in September, 1946. During this pregnancy she suffered a severe exacerbation of her disease characterized by pleural effusion and marked pain and swelling of all joints except those in the spine. Although Case 6 had a questionable skin lesion as an early manifestation, the others developed them late in the illness or not at all. Only Case 6 had treatment with ACTH. This was given before the case came to the Clinic and perhaps was a factor in the disappearance of the skin lesion which had been present by history. It is wondered whether it interfered with positive findings of the L.E. cell and phenomenon.

A letter received from the patient designated as Case 2 states that she was first treated for diabetes in October 1950, when she entered the hospital in coma. Her diabetes has proven to be brittle. She has had several exacerbations of lupus erythematosus symptoms, but at present she is sufficiently well to attend high school. ACTH has apparently been helpful during these exacerbations.

Death in Cases 1, 2, 3 and 5 had been expected over a long period of time. Only Case 4 and Case 6 had autopsies. The fact that both cases autopsied had acute, sudden exacerbations immediately preceding death perhaps helped to obtain postmortem examinations. These autopsied cases are the only ones in which the L.E. cells were not found. This fits in with the observation that the L.E. cells decrease in number as the acuity of the disease increases. L.E. cells are reportedly more common in the early phase of acute disseminated lupus erythematosus. They are not reported in the chronic or subacute forms of lupus erythematosus, but as stated, Haserick has produced the phenomenon in subacute L.E. using normal bone marrow mixed withe the patient's serum. Case 4 had a sternal puncture twenty-four hours before death. Sternal aspiration on Case 6 was performed one week before death. Stained smears did not reveal typical L.E. cells. However, a few poly-

(Continued on page 456)

MEDICAL SCIENCES REVIEWS

In the interests of continuing medical education, The Journal-Lancet *offers this department of authoritative reviews of important progress in scientific medicine, both in the fundamental and the clinical fields. The editors propose to define medical sciences very broadly, and hope that each subject treated will be of sufficient importance to interest every reader.*

Biological Effects of Radiation and the Factors Which Influence Recovery*

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At the present time a tremendous field has developed in atomic research. The study of the biological effects of radiation and the factors which influence recovery becomes more and more important with the increasing use of radioactive isotopes both as a research tool and as a therapeutic agent. Most investigators agree that the effects of radiation on the living cell are probably the same from external and internal radiation sources. This paper will review briefly the known investigations of these effects on the chemical changes in blood and tissues and factors which may influence recovery.

Blood cells and volume. The site of injury with x-radiation and neutron radiation appears to be directly in the blood-forming organs, the bone marrow, lymph nodes and spleen. Cantril and his coworkers[1] have studied the effects of irradiation on the blood and blood forming tissues and have concluded that the lymphocyte and its precursors are the most sensitive cell in the blood system to irradiation. The characteristic response is a diminution in the number of the circulating cells. The degree of diminution depends upon exposure time. The polymorphonuclear leukocytes seem to be less sensitive than the lymphocyte. The earliest change seen in the neutrophilic series from radiation exposure has been an increase in the rate of maturation of the myeloid series in the bone marrow. The circulating neutrophils can be seen to vary numerically after irradiation. A "shift to the left" in the differential count of the neutrophils is regarded as evidence of a definite over exposure in the absence of other causes. The red blood cells are insensitive to the effects of radiation except for long continued exposure. If the red cell count has begun to drop, it may be regarded, in the absence of other known causes, as strong evidence of a severe degree of bone marrow impairment. Platelets are sensitive to irradiation. Bone marrow studies show that the megakaryocytes have the same order of sensitivity as has the myeloid series. The monocytes count is useful for the detection of severe degrees of radiation. Absolute monocytosis means severe irradiation damage. Suter[2] has demonstrated that the peripheral blood counts of animals x-irradiated in large, single, whole body doses show rather a similar type of reaction without regard for species. The anemia which followed radiation from internal and external sources has been found frequently to be a macrocytic.[3]

Storey and Furth[4] have studied the changes of radiation in blood volume and have shown that following irradiation with x-ray of 1000 r in rabbits and 572 r in mice there is a large

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drop in the erythrocyte volume as measured by P 32 tagged cells beginning with the third day and reaching a depth at the seventeenth day after irradiation, and is followed by a slow recovery. There is at first a slight concomitant plasma-volume drop, followed by rise on the tenth day that elevates the lowered total volume but does not bring it up to normal in twenty-three days.

Burns and other delayed effects. Raper and Barnes,[5] in their study of the development of burns following irradiation, have demonstrated that rats subjected to total-body exposure with large doses of beta rays eventually develop burns which are similar to thermal burns. Rats receiving 7500 rep of beta rays develop pronounced erythema. After eight days they become inactive and their feet become extremely red and swollen with exuding plasma like fluid. Superficially beta-ray burns appear to be similar to thermal burns except for the latent period elapsing between the time of exposure and the onset of burn symptoms. The greater distress from the beta-ray burn was felt over a period of time beginning about one week after exposure to 7500 rep and lasting for about two weeks.

Raper and others[6] have studied the delayed effects of beta-irradiation. These authors list the following changes: (1) Alopecia occurs if one-half of the respective median lethal dose is given and usually is observed about two months after exposure. (2) Telangiectasis is observed several months following irradiation in animals. (3) The skin starts to atrophy and becomes very dry and lifeless after exposure. (4) Keratosis is observed about four months after irradiation. (5) Ulceration is entirely a late effect following large doses of irradiation. (6) Opacity of the eyes has been observed about eight months after irradiation. (7) Tumor induction seems to be found chiefly in mice and rats following irradiation. In mice, a single dose of 3000 to 4000 rep produces in the ears fibrosarcoma and squamous carcinoma. In rats, with 4000 rep, single application, skin tumors develop in six months.

Urinary changes. Barnes[7] studied the changes in the urine specific gravity and the occurrence of albuminuria following irradiation in rats. The magnitude of the effect of the beta-rays (5,000, 7,500 and 10,000 rep) was found to be proportional to the dose. The volume of urine was abnormally low and therefore a higher specific gravity was observed than that found in the controls. The greatest percentage of positive tests for albuminuria was obtained between the sixteenth and sixtieth day after exposure.

Proteins. Gjessing and Chanutin[8] have studied the components of plasma by the electrophoretic patterns of rats exposed to nonlethal and lethal doses of x-rays. These authors found a pronounced increase in the nitrogen constituents of the alpha-globulin rich fraction IV-4 and a decrease in the albumin-rich fraction V. There was also a decrease in the gamma-globulin content in fractions II and III.

Antibodies. Jacobson and his coworkers[9] have demonstrated that the antibody formation is suppressed by total body x-radiation. If the spleen or the appendix of the rabbit is protected by lead shielding during total body irradiation, the capacity to produce antibodies to an injected antigen is retained to a marked degree even though the lymphatic tissue elsewhere in the body is temporarily destroyed.

Iron. Chanutin and Ludewig[10] have shown that the serum iron concentration increases in both male and female rats exposed to total body irradiation with x-rays. The average values are significantly increased in both groups during the first day following irradiation with doses of 100 r or greater. The serum iron concentration remains elevated for about a week when animals are given 500 to 600 r. Male animals seem to have higher values of serum iron after irradiation.

Chloride, sugar, uric acid, creatinine, NPN and phosphate fractions. In dogs after single exposure to 500 r total body irradiation, Brown and his coworkers[11] have shown that the chloride and sugar in the blood remained normal after 132 hours. Uric acid and the NPN concentration in the lymph increased within four hours following irradiation. It was found that the creatinine in the lymph decreased within fours following irradiation. Stocken[12] has demonstrated that there is an increase in the barium insoluble fraction of phosphorus in the blood of the irradiated animals with 100 r whole body radiation. This finding suggests that there is an increase in the ATP, ADP and phytic acid fractions following irradiation.

Alkaline phosphatase. Ludewig and Chanutin[13] have measured the activity of plasma alkaline phosphatase of rats and found that a decrease in the activity occurred after exposure of 300 r and prolonged decreases were obtained after 500 to 600 r. This decrease was present on the first day irradiation. Multiple daily radiation with small doses also caused a decrease in the plasma enzyme activity.

Sodium and potassium. Bowers and Scott[14] have demonstrated that rats show a substantial loss of potassium from a majority of the radiosensitive tissues beginning at 24 to 48 hours after irradiation. There is a comparable loss of radiopotassium from the bones. Potassium excretion is increased in the urine of irradiated rats and there is a rise in the fecal levels with the onset of diarrhea. These authors demonstrated that if rats were irradiated at a dose over the LD 50 there develops an absolute potassium deficiency. In several tissues there is a decrease of the sodium concentration after total body irradiation of the LD 50 (800 r), followed by a sharp increase. The decrease in concentration of sodium occurs at the same time as the decrease of the potassium concentration. Urinary excretion of sodium after total body irradiation at the level of the LD 50 shows a complementary homeostatic decrease in response to the excessive loss of sodium through the gastrointestinal tract. These studies were carried out with radiosodium and radiopotassium.

The effect of age, starvation and food intake. Abrams[15] has found that the mortality of mice is low after irradiation of a single exposure of 550 r at the first and fifteenth day of age, very high at thirty days and decreases rapidly with increasing age thereafter. Exposure of rats to x-radiation did not accelerate the rate of weight loss or hasten the death to the animal if they were completely deprived of food.[16] Barnes[7] has shown with rats irradiated (5000, 7500 and 10,000 rep) that there was a reduction in intake of food and water during the first 15 days after exposure, followed by over compensation from the fifteenth day on. The water intake was found to be closely connected with wet desquamation, remaining much above normal as long as large amounts of body fluids were being lost in the skin and decreasing towards the control level as healing of the skin progressed. Normal growth was prevented for thirty-five days after exposure in each experiment.

FACTORS WHICH INFLUENCE PROTECTION AND RECOVERY FROM RADIATION

Metabolic activity. Smith and his coworkers[17] have shown that in mice subjected to 10° to 30° C. environments for two weeks prior to irradiation with 470 to 500 r the survival time is prolonged. Mice kept in a 30° environment that die following irradiation frequently show fatty changes in the liver. Blount and Smith[18] found that the metabolic activity rather than the body temperature is the predominant factor in increasing the moratlity of mice exposed to severely damaging roentgen irradiation. The control group showed 60 per cent mortality, a similar group to which desiccated thyroid had been administered, 55 per cent mortality, and another group receiving thiouracil showed a 9 per cent mortality. Smith and Smith[19] have demonstrated that with 325 to 600 r extra thyroid treated mice are much more susceptible to irradiation and the mortality increases.

Cysteine. Patt and his coworkers[20] have found that cysteine protects an animal against x-irradiation if given either five minutes or one hour before. If the systeine is administered intravenously (175 to 875 mg. per kg.) it protected the animal against total body x-irradiation of 800 r single exposure (90 per cent reduction in the mortality occurs). They concluded that cysteine but not cystine administered to rats prior to x-radiation greatly diminished toxicity.[21] Injection immediately after or six or twenty-four hours before exposure is without effect. Cysteine also improved survival significantly when it is given orally, 30 to 60 minutes prior to irradiation. Smith and his coworkers[22] have studied the quantitative aspects of the protective action of cysteine against irradiation. Cysteine dosage of 950 mg. per kilogram of body weight raises the DL 50 from 765 r to about 1120 r and almost doubles the LD 100. Increasing the dose of cysteine 50 per cent above the maximum tolerance of single dose irradiation and by means of repeated injections 45 to 60 minutes apart, protects 100 per cent of animals exposed to 1200 r.

Glutathione. Chapman and Cronkite[23] have demonstrated that glutathione if injected prior to irradiation, improved the survival rate, decreased the weight loss and reduced susceptibility to trauma of x-irradiated mice exposed to various doses of total body x-irradiation. Four mg. of glutathione per gram of body weight in the mouse is roughly twice as effective as 1.6 mg. of glutathione per gr. of body weight.

Cyanide. Bacq and his coworkers[24] demonstrated that animals given 500 to 600 r showed a hundred per cent death rate but if given 0.1 mg. of sodium or potassium cyanide just before irradiation showed a 50 to 80 per cent survival, but if the cyanide was injected 15 minutes after irradiation the mortality curves were exactly the same as those of the controls.

Vitamins. A beneficial effect of folic acid on anemia and leukopenia following irradiation therapy has been deported.[25,26] Goldfeder and his coworkers[27] have demonstrated an increase in the per cent of survivors and in the survival time of x-irradiated mice receiving 200 micrograms of folic acid and 50 mg. of pyridoxine. However, no significant effect of these vitamins on the hematological changes of the animals have been detected. Stearner[28] has shown that there was no effect of folic acid upon the erythropoietic system following exposure to 675 r. The damage to the bone marrow is probably caused principally by the direct injury effect. Cronkite et al[29] have shown that folic acid fails to alter the clinical course in the hematological picture of a fatal single total body irradiation in swine after exposure to 400 r total body irradiation. Jacobson and coworkers[30] have failed to demonstrate any effects of folic acid after the introduction of P 32 into human beings or Sr 89 in rats. Likewise, vitamin B_{12} failed to modify the anemia and leukopenia of rats exposed to x-rays.[31] Cornatzer et al[32] were able to demonstrate a beneficial effect of vitamin B_{12} and folic acid on the recovery from internal radiation of radiophosphorus in mice. This was demonstrated by introduction of sulfasuxidine in the diet and the mice were injected with a dose of P 32 slightly below the LD 50 (twenty-first day) the administration of vitamin B_{12} and folic acid increased significantly the time of 50 per cent deaths, the average time of survival, and the per cent of survivors (at both the twenty-first and fifty-sixth day after the introduction of a single toxic dose of radiophosphorus). Artom, Cornatzer, and Harrell[33] have demonstrated a marked protection against the toxic effects of P 32 by pyridoxin in experiments in which the vitamin deficiency was made more severe by adding a pyridoxin analog (desoxypyridoxin) to the low protein diet, or by increasing the metabolic demand for the vitamin (high protein diet with added cystine or methione). In groups of mice receiving pyridoxin together with its analog the day of 50 per cent deaths was shifted from the fourteenth to beyond the forty-second, the average survival from nineteen to thirty-three days, and the proportion of survivors at the end of the third week from 19 to 27 per cent.

Rutin (flavonides). Griffith et al[34] have shown that if rats are irradiated with 2385 r in the feet and if rutin flavonol glucoside is administered, recovery time after irradiation is hastened. Rekers and Field[35] have found that the flavone controlled the hemorrhagic syndrome and produced a reduction of mortality following irradiation of 350 r in the dog. There was 64 per cent mortality in the untreated dogs and only 10 per cent in those in which rutin had been administered. In dogs given 350 r single dose total body irradiation, 60 per cent of the untreated animals died whereas 30 per cent deaths occurred following the administration of a preparation from lemon peel whereas when the flavone glucoside rutin was administered pre or post radiation, 11 per cent animals died.[36] Clinical signs and postmortem evidence of hemorrhagic diathesis was most prominent in the untreated dogs.

Diet. Cornatzer et al[37] have found that in mice on a 10 per cent casein, 32 per cent fat diet, that the LD 50 dose of radioactive phosphorus at the twenty-first day is from 4 to 6 microcuries per gram of body weight. The time of 50 per cent deaths, percentage of survivors at the twenty-first day, and the average survival time of mice injected with P 32 are highest with a diet low in fat and in protein and are significantly decreased when the level of fat, or the protein, or both are increased in the diet. Enrichment of the diet with inorganic phosphate seems to afford a moderate but significant degree of protection against the injurious action of radiophosphorus.

Spleen. Jacobson et al[38] found that if the spleen is shielded in mice during irradiation with 1100 r there is a high degree of marked recovery of the hematopoietic tissue as well as recovery of the gastrointestinal tract, significantly hastened by spleen shielding. The shielded tissue apparently may produce a substance which exerts a beneficial effect on recovery of the irradiated animal.

Antibiotics. Simon and coworkers[39] have studied the effects of antibiotics on the mortality from internal radiation. Rats which have died from radioactive phosphorus poisoning or x-radiation,[40] commonly show a bacterial lesion at autopsy. Streptomycin and penicillin in combination (12 mg. of streptomycin twice daily and 20,000 units of penicillin every other day intramuscularly) are effective in reducing mortality of rats given 3 to 6 microcuries of radioactive phosphorus per gram of body weight. Morbidity was also reduced and the survival time prolonged in these studies. Miller et al[41] have shown that streptomycin given by subcutaneous injection (1000 to 7000 micrograms) resulted in the greatest reduction in mortality with three different strains of mice subjected to total body x-radiation in single exposure (450 to 600 r). Gustafson[42] has demonstrated that terramycin was effective in reducing the mortality in rats when administered for a period of only 48 hours prior to 600 r of total body x-irradiation. Terramycin was given in five doses of 100 mg. each at intervals of 10 to 14 hours, beginning 48 hours prior to radiation and ending one to four hours prior to radiation.

Morphine sulfate. Kahn[43] has demonstrated that morphine sulfate, 60 mg. per kg. of body weight, if injected intramuscularly into mice thirty minutes before exposure to total body x-radiation raises the LD 50 of the irradiation from 609 to 830 r. The author concluded that the action of the morphine in protecting mice against the lethal effects is probably by a decrease of the oxygen tension in some radiosensitive tissue or tissues or by some physical effect.

Nitrogen. Hollaender and Stapleton[44] have made a thorough study of the effect of radiation on bacteria. Suspensions of bacteria saturated with air are considerably more resistant to x-rays if nutrient broth is used as a medium than when irradiation is done in physiological salt solution or phosphate buffer. If air is replaced by N_2, the resistance of the bacteria increases, there being little difference if they are suspended in broth or salt solution.

Others. Methionine, ascorbic acid, sodium sulfide,[21] thiocyanate,[24] phenobarbital, cortisone or ACTH and starvation have no effect on the mortality or the recovery from radiation. Smith et al[45] have shown that phenobarbital sedation after irradiation failed to increase the radiation tolerance of mice. Smith et al[46] failed to demonstrate any protection with cortisone or ACTH injected intraperitoneally or subcutaneously in mice irradiated with 500 to 600 r. There were no increases in the survival time or number of irradiated mice surviving.

SUMMARY

Much work has been done in an attempt to determine which element or elements of the blood give the most sensitive index or irradiation damage. Most of the work has been of chronic or single acute exposure. The information obtained from human exposure to radiation is very scant and unsatisfactory because little information as to the amount of exposure has been given.

A characteristic response to the irradiation in the peripheral blood is a diminution in the number of circulation cells. The lymphocyte seems to be the most sensitive cell to irradiation. The leukopenia is observed at about one to two weeks following exposure of external or internal irradiation sources. Associated with the effects of irradiation on the bone marrow is a decrease in the blood volume. These changes in cell and blood volume are probably related to a possible increase in permeability of the cell membrane. Following irradiation exposure there is a decrease in the sodium and potassium content of the tissues with an increased excretion by the gastrointestinal tract and kidney. These changes in cell wall permeability, such as a loss in cation may be associated with some of the early gastrointestinal symptoms of nausea and vomiting of irradiation sickness. The development of burns with a loss of body fluids from acute radiation is associated with cell wall permeability. The albuminuria that is observed following irradiation may also be a change in the permeability of the renal tubules.

The chemical alterations in the blood and tissues such as a decrease in antibodies, gamma globulin, and alkaline phosphatase, is probably a reflection of the changes in ionization in the the cell. The increase of serum iron is probably a result of the breakdown of the hemochromogen tissues or a liberation of the ferritin complex of the gastrointestinal tract.

Much work has been done in an attempt to measure the effectiveness of many compounds on the recovery from radiation. The protective mechanism of many drugs and compounds which influence recovery from irradiation is still not known. The recovery from irradiation seems to be related to the rate of metabolism in the cell. Drugs which stimulate metabolism have a less protective effect. This explains the protective action of such compounds as thiouracil, and nitrogen gas. The specific dynamic action of a high protein diet seems to increase the toxicity of radiophosphorus. The addition of non-radioactive isotopes to the diet will decrease the toxicity of that isotope: for example P 32 or Na 24.

The protective effects of such an amino acid as cysteine from x-irradiation is still not known. The main disadvantage with such protective agents as cysteine or cyanide is that they must be administered immediately before or following irradiation exposure.

The vitamins B_{12} and folic acid are beneficial during the recovery phase following internal irradiation. Rutin helps to prevent the hemorrhagic syndrome following irradiation.

Antibiotics such as streptomycin, penicillin or terramycin are very beneficial as supportive therapy when leukopenia occurs. Following the administration of these antibiotics a large decrease in mortality has been observed in irradiated animals.

Many drugs have been without effect on the recovery from radiation but such compounds as cortisone or ACTH would be beneficial in the treatment when burns develop.

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(Continued on page 457)

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Sixty-Fifth Annual Meeting

Fargo, North Dakota, May 10, 11, 12 and 13, 1952

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W. A. WRIGHT (ex-officio)	Williston
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R. M. FAWCETT	Devils Lake
B. W. MALONEY	Lamoure
A. K. JOHNSON	Williston

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G. D. ICENOGLE	Bismarck
G. W. SEIBEL	New Rockford
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Committee on Arrangements for Annual Meeting

General Committee:

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A. C. FORTNEY	Fargo
BUDD C. CORBUS	Fargo
C. H. HEILMAN	Fargo
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L. G. PRAY	Fargo
W. H. LONG	Fargo
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B. URENN	Fargo

Committee on Scientific Program:

Appointment expiring 1952:

V. G. BORLAND	Fargo
R. B. WOODHULL	Minot

Appointment expiring 1953:

A. E. HAUNZ	Grand Forks
C. H. PETERS	Bismarck

Appointment expiring 1954:

J. D. CRAVEN	Williston
GUNDER CHRISTIANSON	Valley City

Committee on Entertainment:

BUDD C. CORBUS, Chairman	Fargo
G. A. DODDS,	Fargo
R. G. ROGERS	Fargo
W. A. STAFNE	Fargo
C. M. HUNTER	Fargo
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E. M. HAUGRUD, Chairman	Fargo
B. F. AMIDON	Fargo
W. E. LeBIEN	Fargo

Committee on Registration:

R. D. WEIBLE, Chairman	Fargo
J. F. SCHNEIDER	Fargo
W. B. ARMSTRONG	Fargo

Committee on Publicity:

O. A. SEDLAK, Chairman	Fargo
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H. W. HAWN	Fargo

Committee on Transportation:

F. A. DeCESARE, Chairman	Fargo
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J. R. DILLARD	Fargo

Committee on Auditorium:

C. H. HEILMAN, Chairman	Fargo
F. M. MELTON	Fargo
E. M. HAUGRUD	Fargo

REFERENCE COMMITTEES

To consider reports of the President, Secretary and Special Committees:

N. A. YOUNGS, Chairman	Grand Forks
D. J. HALLIDAY	Kenmare
M. S. JACOBSON	Elgin
R. W. RODGERS	Dickinson
J. R. DILLARD	Fargo

To consider reports of the Council, Councillors, Delegate to the A.M.A. and Member of the Medical Center Advisory Council:

W. H. GILSDORF, Chairman	Valley City
F. R. ERENFELD	Minot
GEORGE WALDREN	Cavalier
THOMAS PEDERSON	Jamestown
W. R. FOX	Rugby

To consider reports of Standing Committees, except the report of the Committee on Economics and its sub-committees:

A. R. SORENSON, Chairman	Minot
O. A. SEDLAK	Fargo
H. E. GULOIEN	Dickinson
J. D. CRAVEN	Williston
C. V. BATEMAN	Wahpeton
K. G. VANDERGON	Portland

To consider report of the Committee on Medical Economics, including the Sub-Committees on Prepayment Medical Care, Veteran's Medical Service and Rural Health:

R. B. RADL, Chairman	Bismarck
CHARLES GRAHAM	Grand Forks
A. K. JOHNSON	Williston
G. W. TOOMEY	Devils Lake
C. HEILMAN	Fargo

Committee on Resolutions, to include New Business:

A. C. FORTNEY, Chairman	Fargo
WALTER DAILEY	Grand Forks
R. O. SAXVIK	Bismarck
THOMAS CABLE	Hillsboro
G. CHRISTIANSON	Valley City

Committee on Credentials:

E. M. HAUGRUD, Chairman	Fargo
PHILIP ARZT	Jamestown
V. S. QUALE	Grand Forks

PROCEEDINGS OF THE HOUSE OF DELEGATES

of the North Dakota State Medical Association

Sixty-Fifth Annual Meeting

First Session, Saturday, May 10, 1952

The first session of the House of Delegates of the North Dakota State Medical Association was called to order by Speaker of the House, Dr. A. E. Spear, at 8:00 p.m. in the South Room of the Gardner hotel, Fargo, North Dakota, May 10, 1952.

Dr. E. M. Haugrud, chairman of the Credentials committee, reported that all credentials were in order and a quorum of 18 duly elected delegates were present. The Secretary, Dr. E. H. Boerth, called the roll. The following doctors responded: G. W. Toomey, Devils Lake; A. C. Fortney, Fargo; O. A. Sedlak, Fargo; E. M. Haugrud, Fargo; C. Heilman, alternate, Fargo; N. A. Youngs, Grand Forks; Charles Graham, Grand Forks; Walter Dailey, Grand Forks; J. D. Craven, Williston; D. J. Halliday, Kenmare; F. R. Erenfeld, alternate, Minot; W. H. Gilsdorf, Valley City; M. S. Jacobson, Elgin; R. B. Radl, Bismarck; R. O. Saxvik, Bismarck; R. W. Rodgers, Dickinson; Philip Arzt, alternate, Jamestown; K. G. Vandergon, Portland.

Eighteen delegates answered the roll call. The Speaker declared a quorum present.

The motion was made and seconded that the minutes of the last meeting, as printed in THE JOURNAL-LANCET, be approved and adopted without the formality of being read.

Introduction of President

The Speaker introduced the President, Dr. W. E. G. Lancaster, who welcomed the delegates to the convention and made the following remarks:

"It is always a pleasure to invite a group to one's home town. I hope we succeed in making this meeting a very successful one. There are many sectional meetings that come along with our state meeting. It becomes somewhat of a problem to schedule these meetings. I hope the local men will encourage a return to the lecture hall at a prompt hour for the scientific meetings. We should consider this in courtesy to these men who have come a long way. I believe we should look upon this as a state meeting and not the individual sectional meetings.

I have published my report in the Handbook. It has not been done always but I could see no reason why it should not be published."

The President's Report for the year 1951-1952 is as follows:

Report of the President

My first desire is to bring due attention to the services rendered by our ex-Executive Secretary, Forsyth Engebretson. Mr. Engebretson, as you will recall, took charge of and organized our first state office. He has devoted much time and effort to the welfare of our state association and I would like to suggest that the House of Delegates properly recognize his services. At the same time, I would like to welcome his successor, Mr. Lyle A. Limond, formerly employed by the Minnesota State Medical association and who took office in our state on March 1. Mr. Limond lost no time in assuming his duties and our frequent contact in the organizational work of this annual meeting leaves no question in my mind as to the high quality of the man we have as our new secretary.

The most enjoyable experience of my office has been the visits to the district meetings. I attended all that extended an invitation and want to thank the Bismarck, Dickinson, Williston and Devils Lake groups for the cordial receptions extended me. For some years the First District society has turned over its first meeting in the fall to the President and the Executive Secretary and I believe it is a custom for the good of the society. If I were asked the greatest need of our association, I believe I would state that we need a little closer bond, a need to realize that our aims should be for the betterment of all, a need to see beyond our own particular districts and think and act as a state unit of which each district is but a part.

My travels about the state took me to Camp Grassik and a tour through the new medical building at Grand Forks. This latter would be well worth while for any who have not seen this excellent building and new equipment. I attended here a cerebral palsy clinic and later a mental health clinic.

The Public Health association invited the state association to participate in their annual program held at Bismarck. A panel was formed consisting of Dr. Willard Wright, Dr. L. W. Larson, Dr. M. S. Jacobson and myself from the state group and Mrs. Charles Sewell, representing the rural health committee of the American Medical association. The panel discussed medical service in rural areas.

I represented the association at various state meetings such as the annual meeting of the Business and Civic Federation of North Dakota, the North Dakota Better Roads association, the Railway federation, and spoke at such meetings as the North Dakota State Ministerial association and the annual meeting of the North Dakota Hospital association and the North Dakota State Cancer society.

I was state representative at a meeting called by the A.M.A. in Chicago on February 17, at which time information as to the progress of the American Medical Educational foundation and the National fund was disseminated. On February 23 a meeting was called in Fargo, invitation being extended to the delegates to this annual session, hoping thereby to carry the information to the various districts. Unfortunately, the weather limited our attendance. It is suggested that a permanent subcommittee be set up under the Medical Education committee and it is further urged that each member of the association consider it his privilege and duty to make an annual contribution in support of the medical schools of America.

As to the work of the various committees, I want to thank the various chairmen and members for their support—new projects are in the offing that should interest every member and it is hoped the younger men will take a greater interest. I am convinced some different method of committee service should be in operation and wonder if a man appointed to serve on a committee should not be requested first to state his willingness to do so and thereby consider it an obligation. At one meeting called last fall the chairman of an important committee was the only member present.

In view of the increasing costs of putting on our annual meeting, I hope the House of Delegates will consider some means of meeting the costs—whether that be in the form of a registration fee or a small banquet fee. Since the plan was changed but a short time ago, the state association has had to underwrite the annual meeting an increasing amount each year. At other association meetings you pay for your banquet ticket and in many instances the liquid refreshments as well, and these associations have budgets many times the size of ours. The fact that we have a bank balance in our favor is a very poor excuse for maintaining the present system. That money can be used to greater benefit for the membership at large than throwing parties. Let's throw the party but pay our own way as we do it! It will cost you—all of one house call.

Before leaving the question of annual meetings, might I suggest the consideration of a permanent date for the same—such as the second Saturday in May. We would then obviate the constant difficulty of conflicting dates.

At our last session of the House of Delegates, $3,000.00 was appropriated for instituting a public relations program. Dr. Sedlak will make his report relative to the proceedings of his committee but I feel obliged to assume my share of the responsibility in the failure of a program to be instituted this past year, the reasons best explained in a letter addressed to Dr. Sedlak which he will probably divulge in his report.

W. E. G. LANCASTER, M.D., President

Dr. E. H. Boerth, Secretary, presented the following report, as prepared for the Handbook, which was referred to the reference committee on reports of the president, secretary and special committees.

Secretary's Report

MEMBERSHIP: The total membership for 1951 was 384. Of this number 362 paid their annual dues and 11 were honorary members. Five members died during the past year and several have left the state, either to practice elsewhere or to enter the military service. Eleven doctors are now in the service, making a total membership of 384.

Table I shows the annual membership for the past eight years. From this table one can readily see that the membership dropped until a low of 313 paid members were recorded in 1945. Since that time, there has been a slow but appreciable gain in membership.

TABLE I

Comparison of Annual Membership

	1944	1945	1946	1947	1948	1949	1950	1951
Paid memberships	318	313	322	342	356	364	356	362
Honorary membs.	10	9	9	8	5	13	12	11
Dues cancelled, military service	61	59	57	4	0	0	0	11
	387	379	335	350	361	377	368	384

Table II shows that the annual dues for 1952 are coming in quite promptly. There are still a number of members who have not paid their 1952 dues and the district medical society secretaries and councillors are urged to use every possible means to collect the dues of these delinquent members.

TABLE II

	May 5 1946	May 1 1947	May 1 1948	April 15 1949	April 30 1950	April 30 1951	Apirl 15 1952
Paid-up members	305	316	320	302	309	307	249
Honorary members	9	8	6	9	11	11	8
To be honorary				4	1	2	2
Dues cancelled, military service							11
Associate			1	1			
	314	324	327	316	321	320	270

	State Association Memberships 1951			State Association Memberships 1952			A.M.A. General Membs.	
	Reg. &	Rtd.	Hon.	Reg. &	Rtd.	Hon.	1951	1952
First	53	6	—	61	—	—	61	59
Devils Lake	19	1	2	18	1	1	20	18
Grand Forks	39	1	3	—	—	2	37	—
Kotana	12	—	—	12	—	—	11	11
Northwest	43	—	2	38	—	1	28	35
Sheyenne Valley	9	1	—	8	1	—	9	8
Sixth	60	5	3	53	8	3	43	47
Southwestern	19	—	—	15	2	—	3	—
Stutsman-Southern	22	2	1	23	—	1	23	22
Traill-Steele	9	—	—	9	—	—	6	7
Tri-County	6	—	—	—	—	—	6	—
	291	16	11	237	12	8	247	207
				249				

You will note there is no membership shown for 1952 for the Tri-County district medical society, inasmuch as this particular society has disbanded and its members have joined other district societies. Several of the societies show a paid-up membership for the current year, but others have forwarded only partial reports. The constitution and by-laws of the North Dakota State Medical association states that such dues should be forwarded to the state office not later than March 1st of the current year and due to the press of work in the state office prior to the annual meeting, it would be extremely helpful to the office staff if a majority of the membership dues were processed earlier in the year.

Your Secretary wishes to take this opportunity to congratulate the Executive Secretary and his staff on the continued efficient management of ther office. It was with regret that we received the resignation of E. Forsyth Engebretson, who served as executive secretary for a period of six years. The affairs of the society are so manifold that it now requires the services of a full-time executive secretary and we have been fortunate in securing the services of Lyle A. Limond, former field secretary of the Minnesota State Medical association. Mr. Limond will be in close contact with all members of the association and should form an even closer bond between all the district socient management of their office. It was with regret that we

E. H. Boerth, M.D., Secretary

Executive Secretary's Report

Your new Executive Secretary, Lyle A. Limond, has graciously invited me to submit to you one final report. I am very grateful to him for doing so, as it gives me an opportunity to bid farewell to those of you whom I have not seen during the past year and to express to all of you my thanks. It also gives me the opportunity to say a few things about Mr. Limond which he no doubt would not state about himself. Mr. Limond comes to this association with an excellent background and ability to do good work for your association. Prior to World War II he was engaged in the field of education and among other duties while attached to the teaching staff of the Moorhead high school, he coached their basketball squad. Following World War II, he was active in the field of public health work for the Minnesota State Medical association under Mr. Rosell, and did much to improve the understanding in Minnesota between doctors of medicine and the press. He organized and held numerous local medical-press conferences, which were met with great success. He is indeed familiar with the problems of local component medical societies which make up a state medical organization and intends to spend a great share of his time in the field, both with the local doctors and such other local organizations as are interested in medical and health problems. I would like to state at the outset that Mr. Limond comes to this office under trying circumstances. He was chosen from a field of good candidates only in February and was unable to leave his position with the Minnesota State Medical association until March, leaving him hard-pressed for time for the handling of the details of an annual meeting, particularly with respect to the details of committee work and the accumulation of reports for the makeup of the handbook for the House of Delegates. To add to his pressure, the writer of this report has been unable to properly take care of the details of your state office for this past year. I should have stepped down at the last annual meeting in May as I had the inkling at that time of the very expanded demands on my time in the practice of law brought about by the great oil rush in western North Dakota. The writer finds it quite common of many people to be loath to admit that one is trying to handle too much and that was, I like to think, my case. For the years following, you will now have a full time executive secretary and I am sure that your organization will prosper more and more in the effective work you wish it to carry out.

1. *General Work:* I am keenly conscious of the profuse use thus far in this report of the personal pronoun "I", which the writer is sure has been used in previous reports to a much lesser extent. From the nature of this report, however, I seem to be unable to help keeping it from being personal in tone. I will make short shift in reporting the state of affairs in your central organization and will get on to some things I do want to say. With the exception of Mr. Limond, your office remains as you have known it for the past year or more. Mrs. Margaret Fremming is still our able secretary and Mrs. Anita Meisner our very efficient director of the veterans medical service division. In another report contained in the handbook, I am certain that you will be very pleased to note the repayment by this division of a substantial amount of the loan made by the association to the division at the time the veterans medical service plan was established. This repayment, together with a sum which must necessarily be kept on hand for the operation of the division, plus the furniture, fixtures, equipment and supplies of the division, properly depreciated, comes to the approximate sum of $5,000.00, which was the entire amount of the initial loan. The program is now being carried on a cost basis wtih the Veterans Administration, which means that the association in the future cannot lose financially under the program. This has been an off-legislative year, hence no legislative report relative to the North Dakota State legislature. The A.M.A. has continued to do an outstanding job with respect to federal legislation. The only bill pending in Congress which seems to have very wide support and is detrimental to the interests of medicine is the bill for federal support to medical education. As pointed out to the membership in one of this year's Newsletters, your A.M.A. has sought to combat this idea by the establishment of a Medical Education Foundation, thus encouraging necessary financial support to medical schools through the voluntary contributions of doctors of medicine and those interested in the medical and health fields. Your president, Dr. Lancaster, is exceedingly interested in this project and as reported before, the donations to date fall far short of accomplishing the purpose of proving to Congress that federal aid is not needed. The A.M.A. and all state and local component societies have much work remaining to do in this field. The Woman's Auxiliary continues to grow in number of membership and in efficiency and enthusiasm. The state office should always be mindful of opportunities to work with the Auxiliary and to call upon them for cooperative work with this association. The state office continues to issue a quarterly Auxiliary Newsletter which has been edited by Margaret Fremming, thus accounting for its improved readable interest.

2. *Meetings*: The writer, of course, has been out of this office for several months and is not personally acquainted with the reports of the various committees which are now being submitted. These reports are coming in well at the present time and if they are not quite as voluminous and detailed as they have been during the past several years, it is the fault of the writer in not making arrangements for committee meetings as he should have. I have, through the first part of February, attended the various meetings of the council and the committee on public policy and legislation. Due to a press of time, your ex-executive secretary has attended in the way of national meetings only the North Central Medical conference held in Minneapolis and the interim session of the A.M.A. held in Los Angeles. It is with great regret that in my last year I did not get around to all of the local district societies, but have attended during the year meetings only in Fargo, Bismarck, Dickinson and Williston.

3. *A Short Reminiscence*: Five years, the length of time I have been with the North Dakota State Medical association, is in many ways both a short and long period of time. In the course of events it is but an instant, but from the standpoint of becoming well acquainted with individuals and acquainted with the problems of a group of our society, it has been an adequate time. I have always admired persons whose life work is spent in a following which accomplishes a positive seeable and measurable good. Many occupations and professions have such characteristics to a greater or lesser degree—but probably none to such a marked extent as the practice of medicine. And still "the good result" is far short of what must be expected of doctors of medicine. As the intangible of the mind must often be skillfully dealt with in order to mend the physical being of the person, so must the intangible of public attitude and a recognition on the part of all physicians of the important relation of all persons to our society be accomplished before an individual will develop the same feeling towards medicine as a group that the individual does almost without exception have towards his own personal doctor. It is an anomaly that with our ever advancing society which is said to have more and more made people dependent on one another that the closer

beings are thrown against each other the more suspect they become of their neighbor. That man is said to be a social being is not a whole truth. He has much of the anti-social in his nature, too. Throughout modern history there seems to have been but one "thought tool" applicable to the solution of this problem—"Do unto others as you would have them do unto you." This does not require a namby-pamby attitude all clogged with emotion. It doesn't ask that an end be put to hard-hitting competition which has been the basis of the remarkable development of this country, or a submission to unjustifiable attack. I have seen many things in my work during the past five years and for the most part I was proud of what I saw. I saw this organization and the A.M.A. hit hard at socialism and communism and had a part in it myself. I shall always remember, with pride, the singular opportunity given to me through the Jamestown workshop meetings, of carrying to the Congress of the United States, as medicine's only witness, the plot of the F.S.A. for the grass roots socialization of American medicine. Although it may not have been all to the good, I remember, with gratitude, the hard-hitting disclosures and prophecy of the National Physicians' committee, one of the early effective voices raised against communism following the last Great War, at a time when such talk was not entirely popular because of the war just fought on the side of our Russian ally. I remember the A.M.A. stirring as if from a sleep—to take over the work of the N.P.C.—work which probably should have been its responsibility in the first place and remember the A.M.A. shaking its roots and becoming more and more the representation of the will of the American physician and more and more conscious at the same time of its responsibilities to the people of this country. I remember this association, and the A.M.A., too, on many instances standing for a principle in which it honestly believed. To militantly fight for a principle is good, provided one knows the principle to be an honorable one. To fight, hurt, slight or embarrass a person without principle is bad and that I believe, is the point of the Golden Rule. I have been gratified to see that this association has an alive and keen conscience. Where it has seen a need to be filled it has tried to fill it. It has tried to take the financial sting out of catastrophic illness. The members of the State Board of Medical Examiners were the first to open the doors of the state to the unforunate Displaced Persons physicians. It has tried to improve the care of the veteran and was again "first" in its cooperative program for the care of the Indian on the same basis as his white brother. It has cooperated to the utmost with even federal agencies that would destroy it, so long as such cooperation met the standards of honorable principle. Before bowing out I want to say a simple thanks to all the doctors of this association who are friends of mine. Those who have been particularly helpful are too numerous to mention. Will miss not being at the annual convention. Drop in when you are in Bismarck.

E. Forsyth Engebretson, Ex-Executive Secretary

Report of Executive Secretary

The present Executive Secretary, having held this position for just two short months, has nothing startling to report.

I have come to the progressive state of North Dakota with some knowledge of Medical Association background, having served as field secretary of the Minnesota Medical association for a little over three years. I do not know all the answers in this line of work. But this I promise the members of the North Dakota State Medical association—I am willing to learn and will give faithful service to the best of my ability with the belief that we must keep moving forward in a positive manner if we as citizens are to preserve our American traditions. The only "ism" I believe in is Americanism.

During the past two months your new Executive Secretary has been able to attend a few committee meetings as well as some of the seminars put on by the Cancer society for the doctors of North Dakota.

I am happy in the opportunity presented to me in this work and I know I will enjoy working with you and for you in making North Dakota a still better state in which to live.

In the months to come I hope to become better acquainted with the members of the North Dakota State Medical association, plus the various organizations and the people in general in this, my recently adopted state.

As in the past, under the leadership of my able predecessor, Mr. E. Forsyth Engebretson, your state office stands ready to give service in any way it possibly can. I have been particularly fortunate in falling heir to very competent ladies—Mrs. Margaret Fremming, office secretary and Mrs. Anita Meisner, director, Division of Veterans Medical Service.

Lyle A. Limond, Executive Secretary

Accounts of Executive Secretary

COMPARATIVE BALANCE SHEET

March 31, 1952

	April 30, 1951	March 31, 1952
ASSETS		
Cash in bank	$ 3,166.44	$ 2,814.15
	$ 3,166.44	$ 2,814.15
LIABILITIES		
Social security tax accrual		$ 51.52
Withholding tax accrual		173.40
FUND BALANCES		
General fund	$ 2,358.98	$ 1,387.77
Convention fund	1,266.74	1,676.14
Medical examiner's fund	(160.63)	(47.87)
Public relations fund	(398.65)	(426.81)
	$3,166.44	$ 2,814.15

CONVENTION FUND

Receipts and Disbursements for the Period from May 1, 1951 through March 31, 1952

RECEIPTS	$ 4,619.87	
DISBURSEMENTS	4,210.47	
Excess of receipts over disbursements		$ 409.40
Less: Opening balance		1,266.74
Balance in fund, March 31, 1952		$ 1,676.14

PUBLIC RELATIONS FUND

RECEIPTS	$ 298.65	
DISBURSEMENTS	426.81	
Excess of disbursements over receipts		$ 128.16
Add: Opening deficit		298.65
Deficit in fund, March 31, 1952		($ 426.81)

MEDICAL EXAMINER'S FUND

RECEIPTS	$ 160.63	
DISBURSEMENTS	47.87	
Excess of receipts over disbursements		$ 112.76
Less: Opening deficit		160.63
Deficit in fund, March 31, 1952		($ 47.87)

GENERAL FUND

Receipts and Disbursements for the Period from May 1, 1951 through March 31, 1952

RECEIPTS:		
N D.S.M.A.	$ 7,500.00	
Veterans Medical Service	2,500.00	
A.M.A. (percentage of collections)	41.25	
Total Receipts		$10,041.25
DISBURSEMENTS:		
Repayment of loan to N.D.S.M.A.	$ 2,500.00	
Salary, executive secretary	3,712.50	
Salary, stenographer	2,297.50	
Furniture and fixtures	15.25	
Office supplies	168.28	
Telephone and telegraph	205.48	
Rent	330.00	
Cleaning	72.00	
Postage	120.83	
Travel	1,078.60	
Power and light	6.96	
Social security expense	114.90	
Personal property tax	14.83	
Dues and donations	97.00	
Repair office equipment	30.77	
Miscellaneous expense	247.56	11,012.46
Excess of disbursements over receipts		($971.21)
Add: Opening balance		2,358.98
Balance in fund. March 31, 1952		$ 1,387.77

North Dakota State Medical Association
Veterans Medical Service Division

TRIAL BALANCE

April 1, 1952

	Debit	Credit
First National Bank	$ 3,196.98	
North Dakota State Medical Association		$ 2,500.00
Medical accounts payable		2,600.50
Veterans Administration Center	624.50	
Social Security		15.36
Withholding tax		169.20
Salaries	335.00	
Rent	30.00	
Power and light	1.02	
Telephone and telegraph	7.08	
Miscellaneous	9.99	
Depreciation reserve		649.83
Deficit	433.69	
Furniture and fixtures	1,296.63	
	$5,934.89	$ 5,934.89

Report of the Treasurer

Dr. E. J. Larson, treasurer, presented his report as published in the Handbook:

TREASURER'S REPORT

May 19, 1951 to March 31, 1952
Dr. E. J. Larson, Treasurer

	Balance on hand, May 19, 1951, 1st James River National Bank		$23,025.98
	Receipts from dues, May 19, 1951 to March 31, 1952	$12,222.00	
	Interest on bonds	112,50	
	Refund on check No. 609, Dr. R. W. Henderson	101.59	
	Total Receipts		$35,462.07
	DISBURSEMENTS:		
	Vouchers No. 193 to No. 212 inclusive		
	Checks No. 596 to No. 615 inclusive		
6-18-51	Office Exec. Sec., expenses	$ 2,500.00	
7-14-51	Newberry Ins. Agency, treasurer's bond	25.00	
	Mrs. R. Byrne, steno. exp.	195.00	
	Dr. E. J. Larson, stamps and envelopes	10.00	
	Dr. R. B. Radl, North Central Medical Conference, expense	53.51	
	Office Exec. Secy., public relations program, expense	298.65	
	Dr. W. A. Wright, A.M.A. sessions, expense	310.73	
8-8-51	Dr. R. E. Dyson, White House Conference, expense	185.60	
	Dr. W. A. Wright, Cleveland Session, expense	247.15	
8-20-51	Office Exec. Sec., deficit, 1951 state meeting	1,393.85	
11-13-51	Communications system, Model No. 228 wire recorder	235.06	
	Office Exec. Sec., expenses	2,500.00	
	N. D. Diabetic Assn., diabetic drive	100.00	
11-30-51	Dr. R. W. Henderson, Chicago civil defense meeting, expense	101.59	
12-27-51	Dr. W. A. Wright, A.M.A. house of delegates, expense	315.82	
1-9-51	THE JOURNAL-LANCET, Assn. subscriptions	740.00	
2-18-52	Office of Exec. Sec., expenses	2,500.00	
2-20-52	Office of Exec. Sec., balance of deficit, 1951 meeting	81.02	
3-18-52	Chamber of Commerce of United States, dues	60.00	
3-28-52	North Central Conference, 1952 dues	100.00	
	Total checks issued	$11,952.98	
	Total receipts		$35,462.07
	Less checks issued		11,952.98
3-31-52	Balance on hand, 1st James River National Bank		$23,509.09
	Bonds		4,500.00
3-31-52	Total Assets		$28,009.09
4-2-52	Repayment of loans, North Dakota Veterans Med. Serv.		2,500.00
4-2-52	Total Assets		$30,509.09

Dr. A. D. McCannel, chairman, presented the following report which was referred to the reference committee on reports of the council, councillors, delegate to the A.M.A. and member of the medical center advisory council:

REPORT OF THE CHAIRMAN OF THE COUNCIL
1951 - 1952

The council met May 20, 1951 in the Princess room of the Prince hotel, Bismarck, North Dakota, and Dr. A. D. McCannel, chairman of the council, called the meeting to order at 5:00 p.m. Roll call was taken and the following members were present: Drs. J. F. Hanna, C. J. Meredith, R. D. Nierling, A. R. Gilsdorf, C. J. Glaspel, R. H. Waldschmidt, J. C. Fawcett.

Others present at this meeting were Mr. Engebretson, Drs. Larson, Sorkness, Fortney and Jacobson.

The first order of business was consideration of the budget.

The budget was approved as follows, with two or three additions which will be mentioned later:

Misc. travel expenses for various committees	$1,750.00
North Central Conference	75.00
Official meeting, stenographer	150.00
JOURNAL-LANCET	800.00
Salary, executive secretary	3,500.00
Rental	360.00
Lights	25.00
Telephone	200.00
Office supplies and postage	650.00
Stenographer	2,100.00
Traveling expenses, executive secretary	1,000.00
Miscellaneous fund, executive secretary	750.00
Woman's Auxiliary	200.00

This made a total budget of $11,560.00.

The next order of business was election of officers. Dr. A. D. McCannel was re-elected chairman, Dr. R. H. Waldschmidt, vice-chairman, and Dr. C. J. Glaspel, secretary. Drs. McCannel, Waldschmidt and Nierling were appointed to the executive committee of the Council.

Dr. McCannel brought up the question relative to expending some of our funds for the purpose of creating prizes or scholarships in the medical school at the University. This program was to be under the direction of Dean Potter and Dr. Cardy, and was to include both first and second year medical students. It was moved by Dr. Waldschmidt, and seconded by Dr. Gilsdorf, that the sum of $500 be allotted for this purpose to be subdivided as Dean Potter and Dr. Cardy wished.

The house of delegates had requested the council to appropriate $3,000 for the committee on public policy and legislation for the purpose of developing better public relations. Dr. Fortney, who is chairman of the committee on public policy and legislation, made some brief remarks relative to how this money could be expended. There was some discussion as to whether $3,000 would be enough, but it was finally decided that that would be the initial appropriation and if further funds were needed, they would be voted by the executive committee. That motion was made by Dr. Waldschmidt and seconded by Dr. Meredith and carried.

The house of delegates had further suggested to the council that the recommendations of the sub-committee on rural health be approved; namely, granting the sum of $500 for a survey of rural hospitals. Dr. Jacobson of Elgin, who is chairman of this sub-committee on rural health, spoke at some length relative to the report of his committee. These hospitals are nine in number and are those which have been partially constructed with Federal money (one-third), under the Hill-Burton Act. They are located at Elgin, Hazen, Bowman, Hettinger, Mohall, Watford City, Cooperstown, Lisbon, and Lemmon, South Dakota. The purpose of this survey would be to determine whether the creation of these hospitals has resulted in better medical care for the people living in the rural area which these hospitals serve. Dr. Jacobson recommended that the committee, after conducting a survey and study, would report their findings on the following problems:

1. How successfully is the present rural hospital building program developing?
2. Has the rural hospital building program resulted in interested physicians to locate in rural areas?
3. To what extent has the building of rural hospitals stimulated the development of rural medical centers?
4. What has been the past and present economic experience of the rural hospitals now in operation?

Mr. Engebretson asked whether this survey could be made by the Public Health department, but Dr. Jacobson questioned whether this was feasible. It was Dr. Jacobson's opinion that the survey could best be headed by a medical man but it must be one who was extremely interested in the project. The consensus of the council was that Dr. Jacobson was perhaps the only man who could head this survey and obtain the information which would be vital for an intelligent report.

It was moved by Dr. Waldschmidt, and seconded by Dr. Hanna that $500 be appropriated for this survey.

The bill of Dr. Radl of $53.15 for expenses in connection with his attendance at the North Central Conference in Minneapolis on November 18 to 19, 1950, was approved. Motion was made by Dr. Nierling, seconded by Dr. Meredith and passed.

The state treasurer presented a bill for $5 for postage, which was approved. Mr. Engebretson suggested an addition to the budget in the form of a capital improvement, consisting of a tape recorder. He stated that committee meetings were often held in the evening or on Sundays when a stenographer was not available, and that a tape recorder would fulfill a very useful purpose. He estimated the cost would be about $200. Moved by Dr. Nierling and seconded by Dr. Gilsdorf that he be authorized to purchase this tape recorder.

The council discussed in detail the reserve of $26,000 which we have in our treasury fund and the point was brought up as to whether it would be feasible to establish a student loan fund. The information as to the need of such was very scanty and it was decided to lay the matter on the table for the time being, until more information was at hand.

There was also a brief discussion as to whether this treasury reserve should be invested in some form of securities, rather than left in the bank, drawing 1 per cent interest.

The meeting adjourned at 6:15 p.m

The council of the North Dakota State Medical association again met on February 2, 1952, at 2:00 p.m., at the Cox office library in Bismarck. The following councillors were present: Drs. Hanna, Glaspel, Waldschmidt, Nierling and Gilsdorf. The following were absent: Drs. Fawcett, McCannel, Meredith and Schwinghamer. The following members were also present: Drs. W. E. G. Lancaster, president; O. W. Johnson, vice-president; O. A. Sedlak, W. A. Wright, E. H. Boerth, secretary, L. W. Larson, Joseph Sorkness, vice-president and Mr. E. F. Engebretson, executive secretary.

The motion was made by Dr. Hanna and seconded by Dr. Glaspel that Dr. Lancaster preside in the absence of Dr. Archie McCannel, who was in Florida.

A committee appeared representing the Insurance Federation of North Dakota, headed by President C. T. Tollefson of Fargo and Secretary C. L. Hoffman. A tentative standard insurance form for reporting sickness and accident cases was approved. It was approved by the medical society, but as yet it was not approved by the insurance companies but is now being circulated among the insurance companies for their approval.

The acting chairman of the council announced the resignation of Mr. E. F. Engebretson as executive secretary of the state association. Mr. Engebretson has found that the gradual increase of duties in his private legal practice have expanded so rapidly that he feels he can no longer carry the extra work of our executive secretary. The council accepted Mr. Engebretson's resignation with regret and with a vote of thanks for having carried out such a constructive program for our association.

The following men, who had applied for this position, were interview: C. L. Hoffman of Bismarck, W. J. Pierce of Fargo, George Caraker of Minot, O. S. Gonzer of Bismarck, Lyle A. Limond of Minneapolis and Barney Lavin of Fargo. After considerable discussion as to the qualifications of each candidate, the field narrowed down to Mr. Limond of Minneapolis and Mr. Lavin of Fargo. On a vote of the council, Mr. Limond obtained three votes and Mr. Lavin two votes.

Mr. Limond is 39 years old, has a Master's degree from the University of Minnesota, and at the present time is field secretary of the Minnesota State Medical association and has been for several years. The majority of the council felt that he would be perfectly familiar with all medical matters and would require no breaking in. In addition, he had a recommendation from Manley Briese of the Minnesota State Medical association, which carried considerable weight.

Mr. Lavin is the head of a publicity corporation in Fargo, who has had considerable evperience in matters of public relationship. His firm represents the Otter Tail Power Company and apparently they are prepared to do an excellent job, but have had no medical experience.

Two representatives of the Metropolitan Casualty Insurance company of New York interviewed the council relative to a blanket health and accident policy for the state medical association. This proposed policy is non-cancellable up to the age of 70 and pays $50 a week in case of disability. The premium is $74 a year and it will be necessary for 50 per cent of the members to enroll. The council referred this matter to the committee on medical economics and for its recommendation to the house of delegates.

The council adjourned at 5:15 p.m.

The council reconvened at 7:45 p.m. in the same location. The following members were present: Drs. Hanna, Waldschmidt, Gilsdorf and Glaspel.

The first order of business was an interview with Lyle Limond, who had been selected as executive secretary. Mr. Limond stated that a salary of $5,200 a year would be considered satisfactory, this being approximately the same salary he received in Minnesota. There was considerable discussion whether Mr. Limond should live in Bismarck or Fargo. Mr. Limond's preference appeared to be Fargo, due to the fact that he has relatives in Moorhead. On a vote of the council, Bismarck was selected four to one and Mr. Limond accepted the decision of the council on the matter.

It was agreed that Mr. Limond would enter upon his duties March 1. It was moved by Dr. Nierling and seconded by Dr. Gilsdorf that travel expenses of $750 for the balance of the year be allocated the new executive secretary.

The board was very favorably impressed by Mr. Hoffman, who is executive secretary of the Insurance Federation of North Dakota. His proposition was to unite this office with our office as we both had the same objectives. While this proposal had definite advantages, at the same time it had several disadvantages, so the council finally discarded the idea.

Meeting adjourned.

A. D. McCannel, M.D.
Chairman of the Council

REPORTS OF COUNCILLORS

First District

The usual eight meetings of this society were well attended during the past year. The program was prepared with care and introduced speakers of outstanding ability, including Drs. O. H. Wangensteen and Wesley Burnham of Minneapolis; Drs. Henry Woltman and Jesse Edwards of the Mayo Clinic.

New members to the society this year are Drs. Webster, Wiltse, Cullum, Amidon and Spier. Dr. John Burton moved to Hattiesburg, Mississippi and has established himself in practice. Death claimed one member this past year: Dr. J. R. Ostfield of Fargo.

The society subscribed to a motion to facilitate annual chest x-ray examinations of the school teachers employed by the Fargo school board.

A motion was passed to provide free professional services in the event mass tetanus immunization should become necessary.

The new officers for 1952 are as follows: President, Dr. C. B. Darner, vice-president, Dr. A. C. Burt; secretary-treasurer, Dr. R. D. Weible.

The delegates to the state meeting are Drs. Fortney, Sedlak and Haugrud. The society began preparation for the state meeting to be held in Fargo on May 10, 11, 12 and 13, 1952.

J. F. Hanna, M.D., Councillor

Second District

The Devils Lake medical society had a good year, not only from the standpoint of membership and attendance, but in the number of meetings and interest shown. Our total membership is 21. New members, 3. There were a total of seven meetings, regularly scheduled, of which five meetings had an outside speaker. One of our very best meetings was the cancer symposium put on under the sponsorship of the North Dakota Cancer society. The society also had a minor windfall financially, in that the honorarium paid by the Public Health department for putting on immunization clinics was turned over intact to the society.

Officers for the coming year include Dr. G. N. Vigeland, Rugby, president; Dr. C. A. Corbett, Devils Lake, vice-president; Dr. D. W. Fawcett, Devils Lake, secretary; Dr. G. W. Toomey, Devils Lake, delegate; and Dr. W. Fox, Rugby, alternate delegate.

John C. Fawcett, M.D., Councillor

Third District

The Third District is composed of the Garnd Forks District medical society and the Traille-Steele medical society.

The Grand Forks District medical society has had eight meetings during the past year.

Officers for 1952 were elected at the December meeting and are as follows: A. C. Kohlmeyer, M.D., Larimore, president; H. M. Waldren, M.D., Drayton, vice-president; A. Culmer, Jr., Grand Forks, secretary; delegates to state convention: Nelson Youngs, M.D., Grand Forks; Charles Graham, M.D., Grand Forks; W. C. Dailey, M.D., Grand Forks; alternates: V. S. Quale, M.D., Grand Forks; George Waldren, M.D., Cavalier.

The active membership of the society numbers 41, as of April first. New members are Drs. Phil Berger, Wallace Nelson, Jack Revere, James Cole, Wilbur Koons, Grand Forks, and Carl H. Calman of the University.

Dr. Arthur A. Rathkey of Grand Forks entered military service and Warren Randall of Grand Forks left North Dakota.

There has been one death, Dr. F. N. Burrows of Bathgate, who has been in retirement for several years due to advanced age.

Guest speakers included Dr. Bob Hulit of Minot, who discussed heart disease and pregnancy; Dr. Pearlstein, consultant for the Crippled Children's home at Jamestown, who spoke on spastic paralysis; Drs. Creevy and Webb of Minneapolis who discussed the problems involved in prostatectomy, and Dr. William Cornatzer of the University medical school, who discussed atomic medicine. Medical films were presented at the December meeting.

The Diabetic detection program was endorsed by the society and under the direction of Dr. Edgar Haunz of Grand Forks, turned in an excellent record.

The Traille-Steele district society has a membership of nine and has had three regular meetings during the year.

Total number who have paid state and local dues for 1952—9. Total number who have paid A.M.A. dues for 1952—7.

Present officers are: H. A. LaFleur, Mayville, president; K. S. Vandergon, Portland, vice-president; Syver Vinje, Hillsboro, secretary-treasurer; delegate to state meeting, K. S. Vandergon, Portland; alternate delegate, Thomas Cable, Hillsboro.

One new member, K. D. Vandergon, M.D., of Portland, was accepted by transfer from the Northwest District medical society.

Guest speakers during the year were Dr. William Webster of Fargo, who spoke on prostatic surgery and hemorrhage from the urinary tract; O. R. Stokke of the state public health laboratory in Grand Forks, who spoke on blood donors and blood banks, and A. A. Gustafson of the state public health laboratory in Grand Forks, who gave an account of the material sent in by doctors in this area for diagnosis.

Dr. M. T. Savre of Northwood discontinued his membership in the state association, but remains as an honorary member of the Traille-Steele society.

Your councillor wishes to express his thanks to Dr. Syver Vinje for his prompt reply to all correspondence and for his cooperation in preparing this report.

C. J. Glaspel, M.D., Councillor

Fourth District

We have two medical societies in the Fourth District, the Northwest Medical society and the Kotana society, with headquarters at Williston. We have had the following dinner meetings in the Northwest District medical society:

March 29, 1951, held at the Minot Country club. Speaker, Dr. C. B. Larson of Iowa City, Iowa, who spoke on "Surgical Treatment of Hip Fractures."

April 19, 1951, held at the Minot Country club. Speakers, Dr. A. G. Wells of Duluth, Minnesota, on "Skin Cancer" and Dr. A. J. Kremen of Minneapolis, Minnesota, on "Cancer of Gastrointestinal Tract."

September 27, 1951, held at the Minot Country club; speaker, Dr. Edna Gilbert, Minot State Teachers college, on "Speech Therapy."

October 25, 1951, held at the Veterans hospital, Minot; speaker, Dr. Benjamin Heller of the University of Minnesota medical department on "The Clinical Application of Radioactive Isotopes."

November 29, 1951, held at the Clarence Parker hotel. Speaker, Dr. Coons of the North Dakota state laboratory, who discussed the rabies situation.

January 31, 1951—Election of officers: President, Dr. Martin P. Conroy, Minot; vice-president, Dr. A. F. Hammargren, Harvey; secretary-treasurer, Dr. W. G. Ensign, Minot; house of delegates: Drs. A. R. Sorenson (two-year term) and D. J. Halliday; alternate, Dr. Fred R. Erenfeld. Dr. A. R. Sorenson was re-elected to the Credentials committee for a three-year term. Others members: Drs. Fred R. Erenfeld and L. Henry Kermott, Sr.

New members for 1951 include the following: Drs. W. O. Starks, George L. Loeb, Kenneth M. Amstutz, L. E. Boyum, B. Z. Hordinsky, Thos. Longmire, R. O. Johnson, Marion Wallis, B. H. Girard, P. A. Boyum and Richard Chastain. Transfers: Drs. W. O. Starks, W. J. Ball, Keith Vandergon, H. A. Ohrt, M. A. Spyker, T. E. McGauvran, R. E. Dyson and Thomas Longmire. Deceased: Dr. E. M. Ransom. Member in military service: Dr. O. S. Uthus; honorary members: Drs. J. F. Timm and F. E. Wheelon. Total number of active members at the end of 1951—52 members; number of paid-up members to date—41 members.

February 27, 1952, meeting held at the Clarence Parker hotel; speaker, Dr. Frank D. Naegeli of the Northwest clinic, on "Vesicle Neck Obstruction."

The March meeting was held one week later, on April 3, 1952, at St. Joseph's Hospital dining room, Nurses' Home. Dr. L. A. Christopherson of Fargo, North Dakota, spoke on "Management of Head Injuries."

* * *

The activity of the Kotana District was limited to two meetings in 1951. One meeting was held in January, primarily for the election of officers, and the other in December to meet with Dr. Lancaster, president of the state association, and Mr. Engebretson, executive secretary.

Active members number 12. There were no new members or deaths in this society in 1951.

The elected officers for this year are as follows: President, Dr. E. J. Hagan, Williston; vice-president, Dr. Duane Pile, Crosby; secretary-treasurer, Dr. Donald E. Skjei, Williston; delegate, Dr. J. D. Craven, Williston; alternate delegate, Dr. A. K. Johnson, Williston.

Archie D. McCannel, M.D., Councillor

Fifth District

The following is the councillor's report for the Fifth District medical society for the year 1951.

Four regular meetings of our society were held during the year.

At the annual meeting in January, 1951, Dr. W. L. Macaulay, dermatologist from the Fargo clinic, gave an instructive and practical paper on common dermatological conditions met with in general practice. He showed kodachrome transparencies of the various conditions discussed.

In February the meeting was devoted to a report by the secretary on proceedings at a medical education committee and council meeting which he had recently attended.

In April the meeting was sponsored by the North Dakota Cancer society. Dr. Arnold Kremen, University of Minnesota, talked on cancer of the head and neck, and Dr. A. H. Wells, Duluth, discussed melanoma, nevi and pigmented moles. Both papers were practical and illustrated by kodachrome transparencies.

At the October meeting Dr. Melvin E. Koons, University of North Dakota, was guest speaker. He told of the development of the Blood Bank in North Dakota, and outlined the advantages of this service, when completed, to the physicians of the state. He also informed us of the many new services rendered by the state public health laboratories for physicians in the state.

A Diabetic Detection program was carried out by our society.

The membership of our society is nine, unchanged from last year. Eight practice in Valley City and one in Cooperstown.

Officers elected for 1952 are as follows: President, Dr. N. A. Macdonald; vice-president, Dr. G. Christianson; secretary-treasurer, Dr. C. J. Meredith; delegate, Dr. W. H. Gilsdorf.

C. J. Meredith, M.D., Councillor

Sixth District

Four meetings of the Sixth District medical society have been held during the past year with an average attendance of 33. The membership of the society is 77.

The present officers are: President, Dr. H. M. Berg, Bismarck; vice-president, Dr. E. G. Vinje, Hazen; secretary-treasurer, Dr. C. H. Peters, Bismarck.

New members added during the year were Drs. Kenneth Johnson, Bismarck; Marlin Johnson, Bismarck; Paul Johnson, Bismarck; Anthony Zukowsky, Steele; Arnold Kalnins, Washburn, and J. A. Harrie (associate member), Fort Yates.

Dr. N. O. Ramstad passed away during the past year.

Guest speakers during the past year were: Dr. Fred Kottke from the department of physical medicine, University of Minnesota, who spoke on "Physical Medicine and Rehabilitation."

Mrs. Raymond Reise, director of field service, Welfare department of the state of North Dakota discussed the new program for the permanently and totally disabled. Dr. William H. Hengstler of St. Paul spoke on "Psychiatry in General Practice." Dr. Roy A. Holly, associate professor of obstetrics and gynecology at the University of Minnesota, presented a paper on "Intravenous Iron and Its Clinical Application." Mr. Melvin Koons, chief of laboratory services and director of the blood bank in North Dakota, spoke on the blood bank program. Dr. W. E. G. Lancaster, president of the North Dakota State Medical association, paid us an annual visit and presented to us some of the problems confronting the association.

R. H. Waldschmidt, M.D., Councillor

Seventh District

The Stutsman County medical society, which is the Seventh District society, has had five meetings during the year 1951.

On January 25th a dinner meeting was held. The president read a communication from the Red Cross chairman of the city. The Red Cross wishes to train housewives in first aid and wish to get the approval of the medical society for such. Approval given. The officers for the year were elected. President, Dr. E. J. Larson; secretary, Dr. R. D. Nierling. The North Dakota Physicians service now covers the entire state and has a balance on hand of $55,000, paying out to participating physicians over $10,000 in the past year. There are 21 doctors participating. A film depicting the meeting of the Fourth World Medical Assembly in New York City this past summmer was shown.

The next meeting was held on Thursday, March 22nd. Mr. Engebretson stated that L. W. Larson is the only member of the board of trustees of the A.M.A. who has ever been elected from this section of the country. He outlined the legislative session which has recently been concluded. The problems were not too important or vital to the profession at this session. Dr. L. W. Larson was guest speaker. He is now president of the state association and has held, at various times, in his 25 years of service in the association, all the offices in that association. He stated that the association has grown greatly since the early days and at present has no great problems, except perhaps the connection with the Welfare board. He mentioned the program of the state meeting in Bismarck which is to be held the third week in May. He described his election to the board of trustees and the various meetings he has attended. There were 285 items on the agenda of the last meeting. A summary of the national education campaign was given. This was considered a success. Then the medical education fund for aid to medical school was explained. It is the goal to have each member of the A.M.A. contribute at least $100 yearly to this fund. Lastly, the local problems relating to the medical school at Grand Forks were elaborated upon. It is almost impossible to find professors of pharmacology and biochemistry. More room is needed in the present new Science hall at the University.

A special meeting was held on Tuesday, April 17, 1951. This meeting was sponsored by the North Dakota Cancer society. Dr. Carol Lund of Williston accompanied Dr. Arnold Kremen and Dr. A. H. Wells, guest speakers. Dr. Wells started the discussion with a talk on nevi, melanoma and their treatment. Dr. Kremen talked on the subject of cancer of the head, mouth and neck. Dr. Wells followed with cytologic and biopsy diagnosis of cancer and Dr. Kremen concluded with a discussion of cancer of the gastrointestinal tract. All of these talks were illustrated by kodachrome films and slides.

The next regular meeting was held on Thursday, September 27th. Dr. Place of the state hospital, Dr. Gustin of Gackle and Dr. Fandrick of Kulm were guests. Dr. J. A. Myers of Minneapolis and the Journal-Lancet feel that interesting case reports could be included in the Journal and would like North Dakota doctors to write some. A film on the uses of ACTH concluded the meeting.

The last meeting was held on Thursday, November 15th. Dr. Milton Berg of Bismarck presented the program for the evening. This consisted of the display of x-ray films and kodachrome slides of pathological conditions in the colon, kidneys, gallbladder, appendix and chest.

The society has had one meeting thus far in 1952. On January 31st a regular meeting was held. The following officers were elected: President, Dr. Robert Woodward; vice-president, Dr. Basil Maloney; secretary-treasurer, Dr. R. D. Nierling; delegate, Dr. Thomas Pederson; alternate delegate, Dr. Philip G. Arzt. Secretary Nierling made mention of the yearly dues, $50 for state, $25 for A.M.A., $5 or $10 for county, depending upon whether one resides in the city or not. Don Eagles of Blue Cross and Blue Shield asked for the cooperation of the doctors in two big problems, namely, admitting patients to the hospital for observation, diagnosis, physical examination and surgery upon pre-existing diseases, all of which are not covered by Blue Shield or Blue Cross. Blue Shield showed a gain of 10,000 members in 1951, a total now of 35,000. Melvin Coons, chief of laboratories at the state health department of Grand Forks, gave a talk illustrated by slides about the laboratory examinations and facilities available for us, and he also discussed the blood bank. A film on curare edited by Squibbs concluded this meeting.

R. D. Nierling, M.D., Councilllor

Ninth District

The Southwest District medical society as of December 31, 1951, had 20 active members and three retired members. Dr. J. W. Bowen of Dickinson died on October 22, 1951.

This district had three official meetings in the year of 1951, all at Dickinson.

First regular meeting was held April 17, 1951. It was a dinner meeting at the Elks club followed by a cancer program given in the Knights of Columbus hall. Speakers were Dr. Arthur H. Wells of Duluth, Dr. Arnold J. Kremen of the University of Minnesota, and Drs. Carroll M. Lund and Willard Wright of Williston.

The second regular meeting was held on October 27, 1951. This was a dinner meeting at the Ray hotel followed by a scientific meeting at St. Joseph's hospital. Speakers were Dr. J. J. Spier of St. John's hospital, Fargo, and Dr. Lee Christoferson, neurosurgeon at Fargo.

The final meeting was held on December 12, 1951, at the Ray hotel. We were addressed by your state president, Dr. W. E. G. Lancaster, and by our state society secretary, Mr. E. Forsyth Engebretson. The general meeting centered around public relations, socialization problems and contributions to medical centers by practicing physicians. Officers for the year 1952 were elected: President, Dr. A. J. Spanjers; vice-president, Dr. C. R. Dukart; secretary-treasurer, Dr. H. L. Reichart; delegate, Dr. R. W. Rodgers; alternate delegate, Dr. H. E. Guloien; councillors, Drs. Julian Tosky, A. J. Gumper and A. Martens.

During the year 1951 the Tri-State hospital at Bowman has been opened and is being operated by the Benedictine Sisters of Bismarck. We have also seen completion of the $650,000 addition to St. Joseph's hospital at Dickinson.

A. R. Gilsdorf, M.D., Councillor

REPORTS OF COMMITTEES

The reports of the standing committees, with the exception of the committee on medical economics and its sub-committees were next referred to reference committee number three.

Dr. Radl at this time presented a supplemental report by Dr. Woutat, chairman of the committee on medical economics, which is as follows:

Since the presentation of our report for publication in the book for the house of delegates the following has transpired:

Communication has been received from Mr. B. M. Ryan, chairman of the Workman's Compensation bureau, regarding our proposal for certain changes in the Workman's Compensation bureau's fee schedule. Mr. Ryan informed us that after consulting with other members of the board, they considered it necessary to hold a conference with their actuary before giving us a decision. It will not be possible for them to hold this conference until about the first of July, following which Mr. Ryan will inform us regarding their opinion.

Your chairman and Dr. V. J. Fischer of Minot, a member of this committee, were invited by officials of the North Dakota Accident and Health Underwriters association to participate in a panel discussion on hospital and medical reporting procedures at their state meeting held at Minot on May 6. The chairman and Dr. Fischer were both present and had a very profitable discussion with the many insurance representatives present.

They are uniformly enthusiastic about the adoption of a uniform form for reporting, medical and hospital and disability claims. After considerable discussion they proposed to send one of their representatives to the national meeting of accident and health underwriters which will be held in Denver the latter part of May. It will be his object to attempt to get authorization from most insurance companies to go ahead with the use of uniform reporting forms on a nationwide basis.

It was the opinion of the insurance representatives present that the big majority of insurance companies would accept a uniform form, either the one that we have drawn up in cooperation with them, or the one approved by National Health and Accident Underwriters, and the A.M.A., and the American Hospital association.

It was the thought of some of the representatives present that we should proceed with the use of a uniform form and inform insurance companies that this is what we intend to use. It was pointed out, however, that in case we adopted such an attitude some of the insurance companies might adopt a similar attitude and refuse to pay claims until we filled out their form. Thus, the patients would be deprived of prompt settlement and the physicians might be in an embarrassing position. Accordingly, it was decided advisable to attempt to arrange the matter on a peaceful basis which the big majority of the insurance men present were quite certain could be done. Inasmuch as there are now 100 insurance companies selling this type of insurance in this state, adoption of uniform forms on a national basis is much the better solution to the problem.

We also had considerable discussion regarding other general matters of interest to physicians and insurance representatives and hospitals, and we consider that the attitude of the insurance men present is one of complete cooperation with the medical profession and feel that considerable progress was made in ironing out some of the minor difficulties existing between the physician's attitudes and those of insurance companies regarding accident and health claims.

It is our feeling that our committee on prepayment medical care insurance should act as a liaison committee between insurance companies and the hospitals of the state regarding all prepaid medical care matters and not limit their activities to those of the Blue Shield policy.

We offer the above as a suggestion for the future committee on prepaid medical care insurance and feel that more frequent discussion with insurance representatives and representatives of the state hospital association would result in clearing up many minor sources of irritation on the part of all three organizations.

A communication was received from Mr. J. M. Cooper, area director of the office of Indian affairs, requesting a fee schedule for a number of items of chest surgery not included in our present fee schedule for the bureau of Indian affairs.

After considerable discussion by members of the committee and others, at a meeting on May 10 in the Gardner hotel, it was decided that inasmuch as there is such a limited number of physicians in the state doing chest surgery, it would probably be advisable for the bureau of Indian affairs to make arrangements with those men on a basis of the individual patient. It seemed to your committee that during the time examination of the patient was being done, and decision being made as to the surgical procedure to be employed, the matter of the fee could be decided on an individual basis. It also seemed to your committee that such fees should be based on approximately three-fourths of a standard fee for such work.

Accordingly, it was decided to suggest this procedure to Mr. J. W. Cooper for such consideration.

As mentioned in the original report of this committee to the house of delegates, your committee has had under consideration a number of proposals for a group disability insurance plan for the state medical association. Proposals were considered at a meeting of the committee in the Gardner hotel on March 22 and 23, and at another meeting on the afternoon of May 10, also in the Gardner hotel. Such policies offered by the state representatives of the Washington National Insurance company of Evanston, Illinois, the Continental Casualty company of Chicago, Illinois, and the Metropolitan Casualty company of New York were given detailed consideration. Representatives of the two latter companies explained the features of their policies to the members of the committee and a representative of the Washington National Insurance company explained the features of their policy to the chairman of your committee previously. After considerable discussion, it is the decision of your committee to recommend:

1. That the house of delegates approve the principle of the state association entering into a group disability insurance agreement,
2. That they approve the policy offered by the Metropolitan Casualty company of New York, and
3. That the house of delegates instruct the officers of the state association to take the necessary steps to complete such an agreement with the Metropolitan Casualty company in the immediate future.

P. H. Woutat, Chairman

It was moved by Dr. Halliday that the above supplemental report and the report of the committee on medical economics, and the reports of the sub-committees on prepayment medical care, veterans medical service and rural health be referred to the proper reference committees. This was seconded by Dr. Youngs.

Committee on Medical Education

The members of this committee have been favorably impressed by the improvements that have occurred in the medical school the past year. They are also very gratified that the school has now been fully approved. They want to compliment and congratulate the dean and staff for these improvements and approval.

The committee has studied the complete survey report of the University of North Dakota School of Medicine by Harold C. Lueth, Ph.D., dean, University of Colorado School of Medicine. The recommendations contained in this report are incorporated in Dr. L. W. Larson's report on the North Dakota Medical Center advisory council. Please refer to his report contained elsewhere in this publication for their recommendations.

This committee urges that the recommendations and suggestions made by Dr. Harold Lueth and Dr. Robert C. Lewis in their survey of the North Dakota Medical school be carried out.

H. M. Berg, M.D., Chairman

Committee on Official Publication

The committee on official publication asks leave to report that there have been no complaints registered regarding the Journal-Lancet up to the present time. It seems to be the consensus that the Journal is doing a very good job and will no doubt continue to add new features as time goes on.

It is questionable whether we could do better or as well with some other journal.

P. G. Arzt, M.D., Chairman

Committee on Crippled Children

This committee held no regular meetings during the year, however, a sub-committee, termed the Medical Advisory Committee on Crippled Children's Services, met with the officers of the Crippled Children Services in Bismarck in September 1951. At this meeting a matter of establishing fees to pay for services to crippled children was discussed and a sub-committee to study the matter and recommend fees was appointed. This sub-committee consisted of Dr. Swanson and Dr. Pray of Fargo, Dr. McCannel of Minot and Dr. Waldschmidt of Bismarck. Recommended changes in this fee schedule have been made by this committee and it is the hope that the subject can be concluded in the very near future.

A. R. Sorenson, M.D., Chairman

Committee on Necrology and Medical History

Once more life's eternal comedy and inevitable tragedy has taken its toll of our members. So we set down some vital statistics and a few remarks about the obvious in their lives. How paltry our efforts seem when we consider how deeply the life of a doctor of medicine affects all those he serves. Surely these men have sacrificed much, but few would change their lives if they could. Let us strive to fill the gap they have left in a manner honoring them far better than words.

JESSIE W. BOWEN, M.D.

Dr. Jessie W. Bowen died October 2, 1951. He was one of the oldest members of the Southwestern District medical society. Dr. Bowen was born in 1875. He attended the University of Iowa and graduated from its medical college in 1898. He became licensed to practice medicine in North Dakota in 1903. He practiced medicine in Dickinson from 1907 until his last illness. He became inactive in practice in 1949.

Dr. Bowen was a fellow of the American Medical association, a fellow of the American College of Surgeons, past president of the North Dakota State Medical association, past president of the Southwestern District medical society and of the staff of St. Joseph's hospital, Dickinson. For many years he was a member of the state board of medical examiners. He was one of the physicians that formed the Dickinson clinic.

Bill Bowen, as he was known by his close friends, was one of the thinning ranks of early physicians who began practice in North Dakota at the turn of the century. These were a hardy lot and many of them practiced under pioneer conditions while the country was still being settled by immigrants and those who had the urge to move West. Before moving to Dickinson, Dr. Bowen began practice at Merricourt, where he quickly made friends with another rather remarkable doctor, Howard W. Barbour, who had a hospital at Edgeley. These two young doctors worked out many surgical problems together and it was here that Dr. Bowen's practice had an early trend toward surgery.

J. R. OSTFIELD, M.D.

Dr. J. R. Ostfield died December 18, 1951. He was born in Winnipeg, Canada and graduated from the Faculty of Medicine of the University of Manitoba in 1927. He began practice in Tuttle and remained there from August 1927 to December 1928. Next he practiced at Bowdle, South Dakota, from December 1928 to January 1930. He also practiced as a physician in the North Dakota State hospital at Jamestown from 1930 to 1932. He then moved to Fargo where he practiced until the time of his death.

Dr. Ostfield was especially interested in skin and psychiatric diseases. He was a member of the First District medical society, North Dakota State Medical association and the American Medical association.

EDWARD MADISON RANSOM, M.D.

Dr. Edward Madison Ransom died November 17, 1951. He was born January 25, 1882 at Willmar, Minnesota and received his medical education at the University of Minnesota where he graduated in June 1904. He served an internship at the Northern Pacific hospital at Missoula, Montana before coming to North Dakota where he first practiced at Drake before moving to Minot in 1907.

Dr. Ransom practiced alone until the founding of the Northwest clinic in 1928 and has been on its staff since that time. His medical association affiliation was through the Northwest District society. He was certified by the American Board of Obstetrics and Gynecology in 1940 and was a member of the North Dakota Society of Obstetrics and Gynecology, also a life member of the Central Association of Obstetricians and Gynecologists. He was a member of the North Dakota State Medical association and the American Medical association.

Death followed a cerebral hemorrhage. He is survived by Mrs. Ransom, two sons and two daughters: Edward Ransom of Oakland, California, Mrs. Lester Femreite of Oakland and Mrs. R. J. Fennell of Concord, California. The younger son, Craige, lives at home in Minot. There are six grandchildren.

Dr. Ransom was a Mason and especially active in the affairs of the Congregational church.

NILES OLIVER RAMSTAD, M.D.

Dr. Niles Oliver Ramstad died February 25, 1952 at St. Petersburg, Florida.

Born March 22, 1875 at Meridan, Wisconsin, the son of Mr. and Mrs. John O. Ramstad, Dr. Ramstad attended high school at Eau Claire, Wisconsin and later matriculated in the University of Minnesota, graduating from that university's school of medicine in 1899. Subsequently, he took postgraduate work in medicine at Harvard university and in Vienna, Austria and Berlin, Germany.

In 1900, Dr. Ramstad came to Bismarck to begin the practice of medicine, taking over the practice of Dr. E. P. Quain, who had come to Bismarck in 1899, when the latter went to Europe for postgraduate study. When Dr. Quain returned, he and Dr. Ramstad associated themselves in a partnership which was the beginning of the Quain & Ramstad clinic. This clinic which was formally instituted in 1903 was one of the earliest successful institutions of its kind and grew to a large and highly respected group with a national reputation. Being a pioneer group in this type of medical practice, many of the ideas worked out by Dr. Ramstad and his associates have been widely used by others. Group medical practice as begun by these far-seeing men has had a lasting effect on the practice of medicine.

Dr. Ramstad married Miss Edna Winchester, a daughter of Judge W. H. Winchester, in Bismarck on June 20, 1906. They had one daughter, Edith, now Mrs. William H. Hughes of St. Paul, Minnesota.

Dr. Ramstad was a charter member and former governor of the American College of Surgeons, a diplomate of the American Board of Surgery, a fellow of the American Medical association, past president of the North Dakota State Medical association and former chairman of the State Medical Association's Council, a position he filled for many years. From 1934 to 1948, Dr. Ramstad was president of the Bismarck Medical club. He was past president of the Sixth District medical society and an honorary member of the Southern Minnesota Medical association. Until his retirement in 1949, he was a surgeon on the staff of St. Alexius hospital and chief of staff of the Bismarck hospital since 1939.

In addition, Dr. Ramstad was active in Bismarck business and civic circles for many years. He was a director of the Provident Life Insurance company of Bismarck and had served as a trustee of Bismarck college, Inc., in the direction of Bismarck junior college. He was a former Bismarck city health officer and a director of the Burleigh county Red Cross, a 32nd degree Scottish Rite Mason. He belonged to the Bismarck Kiwanis club, the Elks lodge, Alpha Kappa Kappa medical fraternity at the University of Minnesota and the Newcomers society of England.

In a visit with Dr. Ramstad a few days before his death, he told the writer, "I kept on practicing surgery until I had to rest between operations so I thought it was about time I retired." Physically he had been weakened by a recent attack of virus pneumonia, mentally he was clear as always. The following Sunday night he had a stroke and died early Monday morning. He had labored long and worked hard, but his work was fun.

FLOYD OWEN WOODWARD, M.D.

Dr. Floyd Owen Woodward died July 1, 1951. He was born in Norwalk, Ohio, August 13, 1887. His early schooling was in Norwalk and he graduated from the University of Minnesota and the school of medicine at the same university in 1916. He was married to Miss Alice Hewson in Minneapolis, Minnesota, November 14, 1917.

Dr. Woodward moved to Jamestown in 1920 and made his home there until the time of his death. He served as health officer for Jamestown for many years. He was a member of the American, North Dakota State and Minnesota State medical associations the American College of Physicians and his home sociey of Stutsman county. He was a past president of the Stutsman county society and was affiliated with the Jamestown clinic for 31 years.

The Woodwards were the parents of two children. Surviving him are his widow, a son, Dr. Robert S. Woodward of Jamestown and a daughter, Mrs. R. J. Mork, Janesville, Wisconsin; three grandchildren, and two sisters, Mrs. W. G. Dennis of Davenport, Iowa and Mrs. H. E. Sheldon of Sandusky, Ohio.

F. L. Wicks, M.D., F. I. Darrow, M.D.,
Co-Chairmen

Public Health

A meeting of the committee on public health was held on Saturday, February 16, 1952, at the Johnson clinic in Rugby. The following were in attendance: Dr. Russell O. Saxvik, chairman, Bismarck; Dr. A. C. Orr, Bismarck; Dr. C. O. McPhail, Crosby; Dr. R. C. Little, Mayville; Dr. A. F. Hammargren, Harvey; Dr. O. W. Johnson, Rugby; Dr. C. C. Smith, district health officer, Custer District health unit, Mandan; Dr. F. E. Wheelon, district health officer, First District health unit, Minot; Dr. A. K. Johnson, district health

1951 SYPHILIS CASES BY STATE

Age	Primary M	Primary F	Secondary M	Secondary F	Early Latent M	Early Latent F	Late Latent M	Late Latent F	Late Tertiary M	Late Tertiary F	Neuro M	Neuro F	Cardio-vascular M	Cardio-vascular F	Con-genital M	Con-genital F	Not Stated M	Not Stated F	Total
All ages	13	5	2	7	19	17	41	33	13	8	5	2	2	0	5	4	5	2	183
Under 1															3	1			4
1 to 14						1									1				2
15 to 24	4	2	1	4	4	8		5							1	3			32
25 to 44	6	3	1	2	5	2	11	15	1	1								2	49
45 to 64	3				2	1	18	9	7	5	4	1	1					2	53
65 and over					1	1	6	2	5	2		1						2	20
Unknown				1	7	4	6	2			1		1					1	23

Primary	18
Secondary	9
Early latent	36
Late latent	74
Late (tertiary)	21
Neuro-syphilis	7
Cardiovascular	2
Congenital	9
Not stated	7
Total	183

officer, Upper Missouri District health unit, Williston; Dr. C. Dukart, district health officer, Southwestern District health unit, Dickinson; Dr. W. R. Fox, district health officer, North Central District health unit, Rugby; Dr. George Loeb, superintendent, state tuberculosis sanatorium, San Haven.

The 1951 report of the committee on public health was read by the chairman.

RABIES

The State Health council of the North Dakota State Department of Health at their meeting on January 12, 1952, requested that the public health committe of the state medical association revise Regulation 39—Rabies, of the Rules and Regulations of the state department of health.

Copies of "Excerpt from 'Recent Developments in the Prophylaxis of Rabies' (*American Journal of Public Health*, December 1951)," "Statements of Policy, North Dakota Rabies Commission," "Regulation 39 of the Rules and regulations of the State Department of Health" and "Review of Rabies in North Dakota—1951" were distributed to all members of the committee.

Rabies in animals has been definitely proven to be prevalent throughout the entire state of North Dakota. Its primary foci of infectivity is in skunks. 106 cases of rabies in animals were diagnosed as of January 1, 1952. 78 persons have been bitten or otherwise had contact with a suspected rabid animal and were treated with multiple doses of anti-rabic vaccine.

The public health committee in recognizing that a new public health problem now exists in North Dakota makes the following recommendations:

1. That the state medical association advise the League of Municipalities to promptly establish ordinances for the suppression and control of rabies in animals. These ordinances should be similar to the model ordinance as approved by the executive committee of the League of Municipalities.
2. That information be made available to members of the medical association on the contra-indications in the use of anti-rabic vaccine. In the United States, as many or more deaths have been attributed to the treatment as from the actual disease. Although North Dakota has had no confirmed untoward reaction to the vaccine, national experts continuously caution on the indiscriminate use of anti-rabic treatment.
3. That the medical association request T. O. Brandenburg, state veterinarian, to inform the medical profession as to the criteria for the control of pet animals and to advise the veterinarians in the state to establish uniform immunization clinics.

INDIAN HOSPITALS

A movement has been initiated by the American Public Health association and the state and territorial health officers' association to transfer all health activities of the bureau of Indian affairs to the U.S. Public Health Service. This includes the transfer of Indian bureau hospitals to the Service. As this question involves political, economic and medical-social aspects, a considerable amount of time was spent in discussing the problem. The committee finally decided that the question should be met with a positive stand in *opposition* to the transfer of Indian hospitals to the U. S. Public Health Service for the following major reasons:

1. The transfer would enhance the strength of the Federal Security agency, Oscar Ewing, director. As of now, North Dakota has no direct FSA program.
2. The bureau of Indian affairs and the medical association have formally agreed on a plan of elimination of the Indian hospitals which is now being utilized on the Fort Berthold reservation. Under this plan, the hospitals would be eliminated and the Indian given a free choice of physicians and hospitals.

TUBERCULOSIS

(See following statistical charts on Tuberculosis)

North Dakota is experiencing a definite trend upward in tuberculosis morbidity. At the present time, bed space at San Haven is at a critical point. Besides those now hospitalized at San Haven, there are approximately 300 other known cases of tuberculosis in various stages. Of these, approximately 50 should be hospitalized at the present time. On a rough estimate, 50 or more additional cases of tuberculosis could be found in the Indian population if a vigorous case-finding program was initiated.

George Loeb, M.D., superintendent at San Haven, explained that there was no immediate chance of starting nurses training courses at San Haven and that there would be a continued critical shortage of doctors, nurses, nurses aides and auxiliary help at San Haven.

The public health committee, after considerable deliberation, made the following recommendations:

1. The public health committee believes that the best solution to the total over-all problem of tuberculosis control and hospitalization with adequate personnel and adequate teaching facilities would be the establishment of a 200 bed chronic disease hospital (tuberculosis hospital) at Grand Forks. This recommendation should not be interpreted as meaning approval or disapproval of a four-year medical school.
2. It was further recommended that the State Health Planning committee be informed of the urgency of creating a new chronic disease facility (tuberculosis) and that Hill-Burton money be made available to assist in the construction of such a facility.
3. As tuberculosis in the Indian population continues to be a serious problem and that it is generally believed that many Indians are not now receiving adequate care, the medical association shall request the Indian bureau to provide more bed space either by the erection of an addition to San Haven or as a contribution to the recommended facility at Grand Forks.

A short discussion was held on civil defense problems and the question of biological and bacteriological warfare. No action taken.

The public health committee expresses its approval of the efforts and actions of the rural health committee, M. S. Jacobson, M.D., chairman, and offers its services to that committee in any way as may be fitting.

Russell O. Saxvik, M.D., Chairman

TUBERCULOSIS

Tuberculosis Reported 1951

Reported by private physicians	86
Reported hy sanatoria and general hospitals	102
First reported by death certificates	22
Reported hy mental institutions	1
Reported hy out-of-state reports	7
Total new cases reported during year	218
Provisional number of deaths during year	59

Race and Sex of Newly Reported Cases

	Total	Male	Female
Total	218	110	109
White	171	85	86
Non-white	47	24	23
Total number of active cases in the Central Register under supervision			1,388
Total number of cases given home nursing service by public health nurses during the year			922
Total number of visits for tuberculosis by public health nurses			4,007

Veterans Reported with Tuberculosis

In sanatoriums	30
In need of hospitalization	25
Reported but apparently arrested cases	87
Total	142

PNEUMONIA

Pneumonia Cases by Month

Month	Cases
January	343
February	190
March	256
April	259
May	220
June	173
July	151
August	113
Septemher	140
October	251
November	353
December	411
Total	2,860

Pneumonia Cases by Age and Sex

Age Group	Male	Female
Under 1 month	17	4
Over 1 month and under 1 year	170	133
1 to 4	252	231
5 to 9	154	123
10 to 14	78	59
15 to 19	65	56
20 to 29	109	92
30 to 39	92	113
40 to 49	116	83
50 to 59	119	93
60 to 69	148	103
70 and over	215	166
Not stated	42	27
Total	1,577	1,283

Kind of Pneumonia

Lobar	656
Broncho	1,298
Influenzal	20
Other	710
Not stated	176
Total	2,860

Pneumonia Cases and Deaths by County and City 1951

County and City	No. Cases	No. Deaths	County and City	Cases No.	Deaths No.
Adams	15	1	Nelson	10	—
Barnes	59	3	Oliver	7	—
Valley City	98	3	Pembina	20	2
Benson	41	9	Pierce	22	—
Billings	3	—	Ramsey	35	—
Bottineau	68	3	Devils Lake	36	2
Bowman	17	2	Ransom	15	2
Burke	18	1	Renville	35	2
Burleigh	38	1	Richland	26	2
Bismarck	155	8	Rolette	68	5
Cass	52	1	Sargent	17	1
Fargo	113	9	Sheridan	32	—
Cavalier	14	—	Sioux	10	2
Dickey	20	2	Slope	2	—
Divide	16	3	Stark	18	3
Dunn	16	—	Dickinson	11	1
Eddy	25	2	Steele	7	—
Emmons	28	2	Stutsman	81	3
Foster	21	2	Jamestown	50	4
Golden Valley	37	—	Towner	18	2
Grand Forks	47	3	Traill	20	3
G. F. City	78	4	Walsh	32	3
Grant	39	1	Ward	79	4
Griggs	12	1	Minot	264	5
Hettinger	25	1	Wells	42	3
Kidder	31	1	Williams	37	3
LaMoure	33	1	Williston	32	0
Logan	15	1	States—		
McHenry	80	4	Minnesota	73	—
McIntosh	16	3	Montana	30	—
McKenzie	31	1	South Dakota	37	—
McLean	207	7	Other states	20	4
Mercer	76	1			
Morton	75	3	Total	2,860	148*
Mandan	17	2			
Mountrail	39	6			

*Provisional

Medical Economics

Your committee met in Fargo, in the Gardner hotel, on the afternoon and evening of March 22, and the morning of March 23. The following members were present: Drs. Lancaster, Radl, Jacobson, Rodgers, Keller, Wright, Mr. Limond and the chairman.

During the past few months the council and this committee were approached by insurance representatives on the matter of the state medical association approving a group disability insurance program for its members. Investigation indicates that many state and local medical societies, various medical specialist organizations and many other professional groups have made such arrangements in the past few years. These plans all operate on the basis of the organization signing a master policy with the insuring company, which then makes available to the members of the organization group disability insurance, providing 50 per cent or more of the members participate. Such arrangements appear to afford substantial savings in disability insurance rates. After considerable discussion, it appeared to your committee members that such an arrangement might have merit. Accordingly, it was decided to investigate a few other insurance companies doing business in this field, so that at the time of the state meeting, we might be able to make a specific recommendation.

Mr. James Swomley, executive secretary of the North Dakota Tuberculosis association, appeared before your committee regarding the possibility of his organization arranging with the radiologists of the state and with the superintendent of the state tuberculosis sanatorium at San Haven for the interpretation of all x-ray films paid for by the state tuberculosis association.

The radiologists of the state, through their state organization, have previously indicated their willingness to cooperate in such a program, but feel that inasmuch as the volume of work will increase considerably they should be reasonably compensated for such work. Mr. Swomley was concerned at this time with a proper fee for making the film and for their interpretation. Inasmuch as your committee was not in a position to set an interpretation fee for the radiologists, it was recommended that Mr. Swomley plan in his budget for a fee of about $5 for making the films, and settling the matter of interpretation charges with the radiologists at a later date.

During the past few years there has been a desire on the part of the doctors for some uniformity in sickness, accident and hospitalization insurance forms. Investigation revealed that the council on medical service of the American Medical association in cooperation with various national insurance organizations has been working on uniform forms for a number of years, and has prepared forms which these organiaztions have approved. Further investigation indicated that the North Dakota insurance men, through the Insurance Federation of North Dakota, executive secretary, Mr. C. L. Hoffman of Bismarck, have also done considerable work toward unifying such forms, and had some suggested forms in the process of completion. Mr. Hoffman met with the council of the state medical association at its winter meeting, and was referred to this committee. Your committee met with a representative of the organization and went over their proposed forms, and helped make what we think are further improvements in them. Accordingly, we feel that in the near future there will probably be uniformity of forms of most companies in this field in the state, and possibly nationwide. It must be recognized that there are a few hundred insurance companies operating in the state, very few of which are domiciled here. It is obvious that it will require considerable work to get acceptance of these forms by all companies involved. We are pleased that the insurance men have taken the initial step in this regard, and have offered them our full cooperation.

During the past year, the officers of the North Dakota Radiological society initiated a move to adjust the x-ray fee schedule of the workmen's compensation bureau. Their proposed changes were referred to your committee on medical economics, and approved by all members of the committee by mail vote. The proposals were then presented to the workmen's compensation bureau, promptly accepted, and are now in effect.

Your committee has corresponded with Mr. B. M. Ryan, chairman of the workmen's compensation bureau, regarding adjustments in the general fee schedule. The workmen's compensation bureau is very cooperative, and agreed to discuss any such matter with us at any time. Accordingly, at our meeting on March 22 and 23, the matter was considered and certain adjustments recommended. At the time of this writing these recommendations have been forwarded to Mr. Ryan, but there has not yet been time for a reply.

It is the opinion of your committee that the workmen's compensation bureau has been very cooperative with the doctors, particularly in the matter of adjusting fees for unusual situations.

Your committee wishes to emphasize that the matter of the welfare board fee schedule remains in the same status as was reported last year and the year before. There is no welfare board fee schedule in effect, there has been no further effort on our part to have one adopted, and we have received no proposals from the welfare board.

Inquiries among the committee members indicate that in many localities the physicians have come to a satisfactory understanding with their local welfare board, and are operating satisfactorily without a fee schedule. It is our opinion that such arrangements can probably be effected in most counties of the state through the efforts of the physicians involved. Your committee contemplates no action on the welfare board fee schedule, and feels that the physicians should not anticipate the adoption of such a schedule in the near future. Accordingly, we would recommend that the doctors of the state try to effect agreements with their local welfare boards, if such are not already in effect, and operate without a fee schedule. Care must be taken in such cases that the fees charged are fair and reasonable.

It was reported to the house of delegates one year ago that negotiations were under way with the bureau of Indian affairs for a plan suggested by them under which the doctors would take care of indigent Indians at similar fees to those we had offered to our state welfare board. Since that meeting, such an agreement is in effect for one reservation in the state, and from information available to us, appears to be operating satisfactorily.

PHILIP H. WOUTAT, M.D., Chairman

SUB-COMMITTEE ON MEDICAL PREPAYMENT PLAN

The sub-committee on prepayment medical plans held no formal meetings during the year. The committee on medical economics as a whole discussed the problem of group disability insurance. Another meeting will be held at 1:30 p.m., May 10, and undoubtedly from this meeting will come a definite report on this matter. The committee also agreed to adopt a uniform medical report form pending approval of all insurance companies involved.

O. A. SEDLAK, M.D., Chairman

SUB-COMMITTEE ON RURAL HEALTH

Your committee on rural health respectfully submits the following report:

The rural health committee has been unable to meet with all its members the past year. The meetings have been held in the winter in the past and due to bad weather and rough roads, the committee members have not been able to get together. However, your chairman has corresponded and had telephone conversation with most of the members, discussing rural health problems. The chairman suggests that the rural health committee members get together during the summer and fall to discuss rural problems.

A survey of hospitals and health facilities in rural North Dakota was to have been made this past year. Your committee, especially your chairman, was relying on carrying out this survey during the winter season. The difficult roads and bad weather kept the committee from completing the survey. The survey is to be carried out by personal contact with the rural hospitals and doctors in the communities operating rural hospitals. The tentative survey outline is included in this report and your committee welcomes any criticism or suggestions that he may better the survey.

Survey of Hospitals and Health Facilities in Rural Areas in North Dakota

A. Survey made in towns of 2,500 population and under.
  1. Rural Hospitals
    a. Location of hospital
    b. Name of hospital
    c. Who operates hospital—church organization or community hospital.
      (1) Is there a business manager?
      (2) Is there a superintendent of nurses?
      (3) Is there a combination of business manager and superintendent of nurses?
    d. Cost of building hospital
      (1) Was Hill-Burton money used—and how much?
      (2) How was local money raised and who did the job?
      (3) What is the present indebtedness and what is the arrangement to take care of this indebtedness?
      (4) Number of beds
        (a) Number of surgical beds
        (b) Number of medical beds
        (c) Number of maternity beds
    e. Hospital in operation
      (1) In-patient days exclusive of newborn infant days
      (2) Operating expense
        (a) Cost per patient per day, which included
          (1) Professional care, including medication
          (2) Kitchen and dining room
          (3) Maintenance of property
          (4) Administration
          (5) Laundry
    f. Is income sufficient to meet operating expense including retirement of indebtedness and depreciation.
  2. Doctors
    a. Number of doctors on the hospital staff.
    b. Names of doctors, address and ages.
    c. Doctors practicing independently or as a clinical group.
  3. Nurses
    a. How many graduate nurses
    b. How many practical nurses
    c. How many nurses aids
      (1) Are local girls trained locally and used for nurses aids—if so, are they satisfactory for ordinary bedside care.
      (2) What is your experience with D.P. nurses.
  4. Public Health Facilities
    a. Is there a county health unit or
    b. Is there an organized public health district?
  5. Health Councils
    a. Is there an active rural health council in your community?
  6. Has the building of your hospital resulted in the location of any more doctors in the area which your hospital serves?

From the report "Divisions of Hospitals, State Department of Health, July 20, 1951" there is the following summary on General hospitals:

1. Beds added through completed new facilities and additions	338
2. Beds to be added by construction in progress	889
3. Beds to be added by planned construction	166
4. Estimated total new general hospital beds provided upon completion of above program	1,393
General hospital beds	
1. Existing beds	2,487
2. Beds under construction	657
	3,144

The rural health committee held a joint meeting with the public health association on October 1, 1951, at the capitol building at Bismarck.

Your chairman met with the program committee and the governing council of the North Dakota Public Health association August 30, 1951. Members present were: Leonard Marti, C. Pat Steele, Laura Smith, Alma Raftshol, Eva Dakter, Dr. C. C. Smith and Dr. M. S. Jacobson.

At this meeting it was decided the rural health committee have a panel discussion, discussing rural health problems for North Dakota. The panel consisted of: Moderator: Dr. W. A. Wright, Williston; discussants: Dr. W. E. G. Lancaster, Fargo; Dr. L. W. Larson, Bismarck; Mrs. Charles Sewell, Otterbein, Indiana, and Dr. M. S. Jacobson, Elgin.

Mrs. Charles Sewell, representative of the American Medical association, committee on rural health, was the speaker for the evening banquet. Her topic, "Let's Do It the American Way," was interesting and instructive.

Arrangements are being made to hold another joint session with the public health association again this year. The meeting will be held in Grand Forks, October 10-11, 1952. The rural health committee urges more general practitioners to attend this meeting.

Your chairman attended the national rural health conference at Denver, Colorado, February 29 and March 1, 1952. The conference was well attended.

M. S. JACOBSON, M.D., Chairman

SUB-COMMITTEE ON VETERANS MEDICAL SERVICE

The following is a report of the chairman of the sub-committee on veterans medical service to the committee on medical economics of the North Dakota State Medical association and to the house of delegates.

The veterans medical service division of the North Dakota State Medical association has been in operation for six years.

As you know from our previous reports, an amount of $5,000 had been loaned to the sub-committee by the state medical association to have working capital and to initiate the program.

Prior to July 1, 1951, under the original contract, this office received 10 per cent of the amount of the completed authorization for operating expenses, but this 10 per cent resulted in an amount which was insufficient to cover operating expenses and a sizable deficit was incurred. As you know, from our previous reports, efforts had been made to correct this deficit without complete success. However, we are glad to be able to report at this time that a great deal of progress had been made on this point as on others.

Accomplishments are as follows:

1. *Cash basis*: As one result of a meeting with the Veterans Administration center at Fargo, on April 19, 1951, a new contract was signed effective July 1, 1951, which placed our office on a "cash basis." This means, that each month the actual expense of operating the office is paid by the Veterans Administration. This contract is exactly what our committee desires, and it is, likewise, very satisfactory with the Veterans Administration center. A representative of the finance division of the Veterans Administration at Fargo audited our books on February 27, 1952, and they approved the operating expenses and informed us that they thought the office was being operated very economically; due credit should be given in this connection to Mrs. Anita Meisner, full-time director, who, with a half-time assistant, operates the office efficiently.

2. *Balancing the budget*: The Veterans Administration recognized the justice of our requests that our office was entitled to a reimbursement for the deficit on a "no profit, no loss" arrangement at the time of the original contract. We are happy to advise that the deficit has been paid by the Veterans Administration and that we can balance our books, insofar as the loan of $5,000 from the state medical association is concerned. We have repaid the state medical association $2,500 and the balance of $2,500 is covered by cash in the bank which is required as a circulating fund by our office and in the possession in furniture and fixtures in the office. Our office should have no further financial problems, since we are on a "cash basis" and since the deficit has been repaid.

3. Over the past year, we have been negotiating with the Veterans Administration to have some of the fees raised on x-ray services. Some of the proposed raises in fees were approved on July 1, 1951, when the new contract was signed. On March 1, 1952, we received and approved an amendment to our contract which gave us additional fee raises.

The total amount of fees paid by this office to doctors in North Dakota in 1951, for veterans services, was $43,619. This amount is somewhat less than in previous years; nevertheless, it indicates a high volume of services to the veterans, and definite aid in decreasing the work load of the understaffed veterans administration hospitals.

The chairman of this committee attended a meeting of the state advisory committee on veterans affairs in December, 1951. Governor Norman Brunsdale and representatives of the Veterans Administration of Minneapolis, Fargo and Minot were present. The place of our organization in the veterans system was explained and there was a discussion of mutual problems.

Our relationship with the Veterans Administration continues to be most cordial and satisfactory.

The committee feels that examinations of veterans and reports as prepared, are quite satisfactory. The committee asks the continued operation of the physicians participating in the plan; we are forced to urge greater promptness in submission of reports, however. Robert B. Radl, M.D., Chairman

Maternal and Child Welfare

The committee on maternal and child welfare of the North Dakota State Medical association met in Fargo on December 8, 1951. The committee submits the following for consideration:

1. Complete registration of all infants born is currently being stressed by the U. S. Public Health service. International uniformity of registration practices is being urged in the World Health Organization. It is desired to obtain accurate data on all infants born alive (showing any evidence of life) regardless of the duration of gestation or weight of the infant. Heretofore, an infant born alive after twenty weeks of gestation needed a death certificate if it subsequently did not survive. A certificate of stillbirth is not an accurate statement of the medical events, although considered sufficient by certain physicians. It is now recommended that fetuses of less than twenty weeks gestation also be reported as live born if they show any signs of life whatsoever, and that a separate death certificate be made out if the fetus does not survive. Such a practice will permit more complete statistical studies of infant and fetal mortality and "fetal wastage."

Certain members felt that the above suggestions were not practicable because an infant for whom a death certificate is registered would require burial by an undertaker. The expense to the family for a fetus of less than twenty weeks gestation would not be justified. Examination of the public health laws of North Dakota do not support the above thesis. Whereas proper registration of deaths and stillbirths is required before disposition of the body, and a permit for disposition must be issued, the law does not stipulate that the disposition need be handled by an undertaker. Public health law (code) No. 23-0232 makes the undertaker "or person acting as such" responsible for securing and filing the death certificate with the local registrar. Disposal of the body is the responsibility of the family, and would appear possible in the case of fetuses by having representatives of the hospital assume the usual legal obligations for proper reporting and registration. If cremation were elected, the hospital could perform this duty.

The committee voted to urge adoption by physicians and hospitals of current U. S. Public Health service recommendations, that all infants or fetuses born with any signs of life be reported as "live born" and that a separate death certificate be filed if the infant does not survive.

This practice to be without reference to the apparent duration of gestation.

2. Definition of "prematurity" was reviewed. It was recalled that the medical term "premature" or "immature," is to be applied only to infants weighing less than 5½ pounds (2500 grams) at birth, or being delivered after less than thirty-seven weeks of gestation. The period of gestation is to be calculated as the number of completed weeks since the first day of the last menstrual period. A child who weighs more than 5½ pounds at birth cannot possibly die of prematurity subsequently. Yet the division of vital statistics reports cases listed as "death from prematurity" in infants weighing up to 11 pounds in 1950. (Such cases would appear to require further study to determine the actual cause of death. It is well to point out that even infants weighing less than 5½ pounds at birth usually die of some specific cause other than prematurity if an effort is made to determine the cause of death by postmortem studies.)

The committee urged general adoption of a "Device for computing completed weeks of gestation." This is a cardboard scale furnished by the public health service. It has been sent to all hospitals in North Dakota and may be obtained by writing to the state department of health.

3. Death certificate data reported to the division of vital statistics shows wide areas of ambiguity. Certain hospitals and communities seem to have more of a problem than others. A strip film entitled "Medical Certification of Causes of Death" was reviewd. It contains suggestions of merit for all physicians and hospital record libraries. The committee moved that this film be made use of widely in hospital staff meetings throughout the state.

4. In recent years the state department of health has been forced, for financial reasons, to restrict the number of manuals and pamphlets which it distributed without charge in the areas of infant and maternal hygiene. Whereas the committee felt that certain of these booklets are of definite value, they did not feel that it was an obligation of the department of health to furnish them without charge. It was suggested that parents be advised to procure them themselves at the usual cost of fifteen cents through the children's bureau.

5. Diagnosis of toxoplasmosis by serologic test of the pregnant woman was proposed as a part of routine prenatal serology studies. Doubt was expressed as to the justification for such a procedure as a routine measure. Dr. Robert Tudor was designated to investigate the subject further with the state health department laboratories.

6. The possible relationships between childhood immuniza-

tions and predisposition to paralytic poliomyelitis were considered. It is generally considered that the two topics have no connection except in areas of epidemic polio and in a short space of time (under one month) following an immunization. Three of the members indicated that they had discontinued giving immunizations to children during the slight polio flurry of 1951, but more because of family pressures than from strong medical convictions. The committee felt that data available to date is inconclusive and that they could endorse no official policy.

7. Fluoridation of municipal water supplies as a prophylactic measure against dental caries was discussed. The A.M.A. has recently endorsed the policies of the American Dental association in support of such a program. It has been well shown that addition of fluorides up to one part per million is non-toxic and is of marked value in preventing dental caries. The committee moved to urge the support of North Dakota physicians in a program to obtain fluoridation of municipal water supplies according to prescribed standards.

8. Control of convulsive disorders and "epilepsy" was presented as an issue which is attracting public attention locally and nationally. Certain groups feel that there is need for specially subsidized programs for these cases. The committee did not support these suggestions. It felt that such cases could be adequately handled by the family physicians, being referred by him through the usual medical channels when necessary. (Teachers and nurses should be encouraged to refer such problems to their local physician for initial evaluation.) The committee suggested that North Dakota physicians review their knowledge of treatment of convulsive disorders and make an effort to include the subject in the scientific portion of their local medical meetings.

F. A. DeCesare, M.D., Chairman

Committee on Cancer

The committee on cancer has not held a formal meeting during the past year. All members are members of the board of directors of the North Dakota division of the American Cancer society and as such have had occasion to meet several times. It is anticipated that a meeting of the committee will be held just before the 1952 annual session of the association.

There were 661 deaths due to cancer in North Dakota in 1951. It is estimated that there were about 2,000 living cancer cases in the state during the same year. Thus, cancer continues to be a major cause of death in North Dakota and, with its incident high morbidity, constitutes one of the real problems confronting both the medical profession and the public. The American Cancer society, through its state divisions, is conducting an intensive educational campaign to acquaint the public with the true facts of cancer, to inform them of the danger signals which may mean cancer, and to urge them to consult their own physician whenever such signs do appear. The annual campaigns for funds during the month of April have been most successful. Last year $75,000 was collected in the state and the prospects are very good that this will be exceeded in 1952. The North Dakota State Medical association is urged to give its complete endorsement of the program of the North Dakota division of the American Cancer society and to urge its members to cooperate with the local organizations throughout the state in every way possible. The areas of the state in which the program of the society has been most successful have enjoyed the complete cooperation of the profession with the lay volunteer workers.

The attention of the medical profession should be directed to the necessity as well as advisability of reporting cases of cancer through regular channels. Forms are available through the state health department for this purpose. During the month of January 1952 reports from the state health department indicate that only about one-half of the cases had been reported through regular channels, the other half being noted from the death certificates. It is obvious that all physicians must cooperate in this endeavor if the registration of cancer cases in the health department is to be complete and the statistics derived from the reports are to be of value.

Cancer seminars are to be conducted throughout the state during the month of April 1952 for the physicians of the state. This is the second annual tour conducted by the North Dakota Cancer society. The seminars are designed to bring eminent cancer specialists and timely cancer topics to every North Dakota practitioner. The response to the 1951 tour was most gratifying, about 50 per cent of the doctors in the state attended the meetings. This year a rare treat is in store for those who attend. Drs. Kinsella and Ylvisaker are scheduled to present discussions at Dickinson, Bismarck, Jamestown, Valley City and Fargo during the week of April 14. Their subjects will be "Cancer of the Lung" and "Cancer of the Stomach." Drs. Donoghue and Hagedorn of Rochester, Minnesota, will appear before the societies in Williston, Minot, Devils Lake and Grand Forks during the week of April 23. Their subjects will be "Cancer of the Lung" and "Leukemias." A large attendance is anticipated at each of these meetings and there is no doubt that those in attendance will derive great benefit from the discussions by the very able physicians who have kindly consented to devote a week of their busy lives for this purpose. Dr. C. M. Lund of Williston, a member of our committee, and also chairman of the medical and scientific committee of the state cancer society, is to be congratulated on the success of the first tour last year and the great amount of time and effort which he has given to the development of what will undoubtedly be an outstanding success this year.

L. W. Larson, M.D., Chairman

Committee on Fractures

The members of this committee did not hold a meeting during the year; however, the policies, as carried out in previous years, have been continued.

R. H. Waldschmidt, M.D., Chairman

Public Policy and Legislation

At the 1951 meeting of the North Dakota State Medical association, a motion was made by Dr. Fortney and seconded by Dr. Gilsdorf, that the house of delegates authorize the council to set aside an amount of $3,000 for the use of the committee on public policy and legislation for their work on public relations. This would primarily be for promoting better relations between the public and the association. The motion was passed by the house.

With this directive from the house, the committee went to work. Unfortunately the first meeting was called in Bismarck on a beautiful Saturday afternoon on the opening of the hunting season. A quorum was not present and therefore no definite action on any matter could be taken. At that meeting, however, Mr. Caraker outlined a proposed series of radio programs. These programs were to be of a commentary type, prepared by Mr. Caraker and delivered by Mr. Caraker over the air, after approval by a board of censors to be appointed by the North Dakota State Medical association. Being the only member of the committee present, I agreed to allow Mr. Caraker to prepare some sample porgrams, which I intended to present to the committee at a later date.

About a week after this meeting, Mr. Boler, manager of the Minot and Jamestown radio stations, called our former executive secretary, Mr. E. F. Engebretson, stating that he thought he would have trouble with the Federal Communications commission, and that the program would have to carry a political rate. Mr. Engebretson arranged for a meeting with Mr. Boler and at this meeting Mr. Boler admitted that his true fear was that to produce these porgrams might antagonize the Farmers Union. After much discussion, it was agreed that Mr. Boler would allow the production of programs using Mr. Caraker, providing that at each program a member of our association would also appear and that the program be of a discussion type rather than a program similar to a new analysis. This changed the entire aspect of the program and since Mr. Engebretson felt that he could not act without the approval of the committee, no further action was taken.

At the October meeting, the cost of the program to go out over the Minot and Jamestown stations was set at $63.85 per broadcast. It was understood at that time that this figure was to cover all expenses except the cost of reprints of the talks. However, during the last meeting an additional talent fee was tacked on, making the total $88.85 for each broadcast.

At the North Central conference held in November in Minneapolis various members of the committee were present, and an informal meeting was called and the matter was discussed again. At that time, Mr. Engebretson announced his intention to re-sign. It was decided that the matter of a radio program be dropped until a new executive secretary was appointed and his views on the matter obtained. Mr. Caraker, however, had previously gone ahead and prepared two sample broadcasts, and he insisted that they be presented to the committee.

A meeting was called on January 12 and 13 in Fargo. At this time two wire recordings were presented to the committee. All present were impressed with the presentation and decided to approve the program; however, final approval was to be decided upon by the council at the time they met to choose a new executive secretary.

Three weeks later I, as chairman of the committee on Public policy and legislation, sat in with the council when they chose the new executive secretary. A large number of bids were made for the position, but they finally narrowed down to Mr. Barney Lavin and Associates of Fargo and Mr. Lyle Limond, field secretary for the Minnesota State Medical association. Each had a different approach to the problem. Mr. Lavin and Associates felt they could benefit the association best through a public relations program using mass media. Mr. Limond felt that better public relationship could be obtained through personal contact and through press conferences. It was finally decided to appoint Mr. Limond to the position. Immediately after this lengthy meeting, the council went on record approving the type of radio programs previously decided upon by our committee.

After some serious thoughts about the matter several days later and after obtaining the views of our new executive secretary, it was decided that the matter be dropped entirely for the time being and that a new approach be made to the entire problem at the time of the next state meeting.

I realize that as chairman of the committee I perhaps have not carried out the committees' wishes. I personally do not feel that we have made the right approach to the problem, I think we have been led blindly down one path. If I'm wrong, I'm willing to take all the blame for our failure to carry out this program.

The other directive from the house of delegates to this committee was in the form of a resolution instructing this committee to formulate plans for the selection of members for a grievance committee. It was also to be the duty of this committee to define their duties and to submit their plans to the next meeting of the council. The groundwork for these plans was all laid out by Mr. Engebretson. It was noted that changes would have to be made in our constitution and by-laws to permit such a committee to be formed, especially if they are to be granted disciplinary powers. The plan we had under consideration was based on the plan the Colorado grievance committee follows. Minnesota has an entirely different plan. This report has to be in by April 1st. If any further action is taken, a supplementary report will be submitted. In the meantime, it is suggested that the house again appoint the five last past-presidents to constitute a grievance committee.

O. A. Sedlak, M.D., Chairman

The reading of the following reports was dispensed with and the reports referred to the proper reference committees:

Annual Report of Delegate to American Medical Association

Your delegate attended all sessions of the house of delegates at the annual meeting in Atlantic City and at the interim session at Los Angeles. At the Atlantic City meeting he served as chairman of the committee on sections and section work. He also attended all meetings of the council on rural health and the national conference on rural health held in Denver during February 1952. By action of the board of trustees, the previous committee on rural health has now been elevated to the status of a permanent council of the American Medical association.

A complete summary of the Atlantic City session was pulished in the *Journal of the American Medical Association*, June 30, 1951, page 829, and of the interim session held in Los Angeles in the same journal, December 22, 1951, page 1675. I will mention very briefly some of the actions taken at these two sessions:

1. Continuation of active opposition to all forms of socialized medicine.

2. Opposition to federal aid to medical education. Instead, the A.M.A. offers a voluntary plan by the National Education foundation and all doctors are urged to contribute to this foundation.

3. The election of two outstanding medical leaders, Dr. John W. Cline of San Francisco as president and Dr. Louis H. Bauer as president-elect.

4. The formation of a joint commission on accreditation of hospitals with the American College of Surgeons, the American College of Physicians, the American Hospital association and the Canadian Medical association.

5. Reorganization and expansion of the public relations department or the American Medical association with some curtailment of the national education campaign directed by Whittaker and Baxter.

6. Continuation of the work of all the bureaus and councils of the A.M.A. Aggressive activity by the council on medical service in all fields of medical service and the council of rural health in the field of rural health.

7. Extensive revision of the constitution and by-laws. In particular the coming abolition of the two member classification. That is to say, the abolition of the fellow classification, so that there will only be members in the future and members will be entitled to all the right and privileges, some of which were previously accorded only to fellows.

8. At the Los Angeles session, 84-year-old Albert C. Yoder, Goshen, Indiana, was named as "General Practitioner of the Year." It is always a delight to extend recognition to men who are still actively engaged in efficient medical practice at this somewhat advanced age.

9. Opposition of a new EMIC program.

Many other constructive actions were taken at and between these various sessions, all of which have been fully reported in the *Journal of the A.M.A.* We urge all members of the North Dakota State Medical association to read the organization section of that journal, which contains current information as to the activities of the A.M.A.

It seems well to me at this time to present a slight summary of just what your parent association is attempting to do in its various fields of activity. You all know that primarily the association was formed as an organization intended to improve medical care standards and medical education in the United States. This work continues to be carried on vigorously as well as all the other purely scientific activities of the various councils and bureaus. In recent years, however, we have been called on to protect the doctors and people of the United States from those whose desire it is to control or destroy the practice of medicine as we know it. If one visualizes this continuing social struggle as one between the professional control of the scientific and the economic phases of the practice of medicine, and control by lay groups, it helps in an understanding of the situation in which we now find ourselves. We are continually being attacked by diverse groups of people with various motives but all having the general effect of striving to gain control over this or that segment of medical practice. Such people may be divided into several broad groups.

1. You are familiar, I am sure, with all the efforts of the socializers within the federal government and hanging around the fringes of the various government bureaus, to take over the practice of medicine in this country.

2. Labor unions, cooperatives, and assorted so-called consumers groups. There have been and continue to be innumerable efforts by groups of so-called consumers of medical care which, of course, is anybody who can gather up a large group, to contract for medical care on a mass basis. This is nothing more nor less than corporation practice and where it has gone into effect, it means that a doctor will provide medical care, usually on a salary basis, to a large group of people and be, of course, under the direction of a lay board of some sort. This has happened in some localities to a larger extent than we realize. A current concept being promulgated by various labor union leaders, notably Harry Becker, late of the CIO, is the third party payment principle. In effect, this means that a union leader wishes to establish the principle that someone else is responsible for their health and medical care. This someone else could be the employer, the government, or an insurance agency. This is an extremely pernicious doctrine which is be-

ginning to gain considerable acceptance throughout the country and negates the essential responsibility of an individual for his own welfare. You are going to hear more and more of this idea in the future. It may well be the idea which will eventually destroy voluntary health insurance.

3. The third group who would like to gain more control over the practice of medicine consists of various philanthropic foundations who have fallen into the hands of dreamers and planners who feel that the traditional American way of individual reliance on themselves is not good enough.

4. The fourth, of course, is the situation as between doctors and hospitals. Many hospitals have leaders who feel that the hospitals should increasingly project themselves into the practice of medicine. Which means, of course, that they would prefer to hire doctors to work for them on a salary basis.

Currently there are a number of situations affecting the medical profession which will not bear close scrutiny:

1. The so-called Lehman bill which in effect is a proposal for a new EMIC. I think none of us want to see that thing returned.

2. Socialized medicine as such is not now an active issue and will probably not be an active issue in the next political campaign. However, those people who favor socialized medicine are still working and they are making innumerable fringe proposals which will have the eventual effect of leading to complete socialization. One of these proposals, for example, which may have far-reaching implications, would be for the government to provide money to buy memberships in voluntary health insurance plans. Such proposals, while praiseworthy on the surface, could well lead to complete government control of voluntary plans which in turn would lead to socialization.

3. There are currently at work studying the medical and hospital picture, two commissions. One, the commission to study the nation's health appointed by President Truman, Dr. Paul B. Magnuson, whose reputation you are all familiar with, as chairman. This commission consists of fourteen persons, four of whom are definitely favorable to socialized medicine—six of whom have leanings that way—and the remainder might be said to be neutral or favorable to our viewpoint. No doubt this commission was appointed by President Truman as a political maneuver to get him off the hook of socialized medicine during the coming campaign. Due to this fact, the A.M.A. declined membership on the commission and attacked it when it was first formed. Apparently this commission proposes to digest and resolve various studies in the medical care field, and perhaps come out with some conclusions. It is difficult to see what good could be accomplished by this group, much as we may respect the good will and sincerity of its chairman, Dr. Magnuson.

The second commission is known as the Commission on Financing of Hospital Care, which has been established by the American Hospital association. Although set up by the American Hospital association, this commission has been organized as an independent body and is being financed by a half million dollar contribution from various foundations, notably the Millbank Memorial fund, the National Foundation for Infantile Paralysis, the Rockefeller Foundation and the Health Information Foundation. The latter group is financed by contributions from various pharmaceutical houses. The chairman of this commission is Gordon Gray, president of the University of North Carolina and former secretary of the army. The director is Graham Davis who has long been associated with various foundations. The associate director is Harry Becker who has been granted leave of absence from his duties as welfare director of the United Auto Workers, CIO, in order to take this post. Harry Becker has been known for many years as an advocate of socialized medicine, although at the present time his supporters deny that he is in favor of socialized medicine. Most of us feel that Mr. Becker is not likely to be objective in his conclusions. Also serving on this commssion is Dr. Leonard Larson of Bismarck. A limited personal acquaintance with Mr. Graham Davis and some slight personal experience with their methods of inquiry would not suggest that this commission is going to come up wtih any very far reaching conclusions. However, it is probably not fair to pre-judge such a study, but medical and hospital people should watch it very closely.

In conclusion, I would like to point out that:

1. The fight for lay control of the practice of medicine will never end and we must be unceasingly vigilant in our efforts to protect the profession from domination by outside organizations.

2. Doctors must recognize their duty as citizens and exercise their rights at the polls to see that the creeping trend toward socialization is reversed.

3. There is a need for all members of the state medical association to contribute to the national fund for medical education of the A.M.A.

4. The American Medical association is *your* association and needs and deserves full support of every member.

W. A. Wright, M.D., Delegate

Medical Center Advisory Council
1952

Great progress has been made by the University of North Dakota school of medicine since the last meeting of the house of delegates. Full accreditation of the school was granted by the Association of American Medical Colleges in October 1951 and also by the council on medical education and hospitals of the American Medical association in December 1951. This is a noteworthy achievement, credit for which is due the president of the university, Dean Potter, the faculty of the medical school, the board of higher education, and the advisory council. Special commendation is due Dean Potter who has been able to assemble a creditable faculty in a remarkably short time.

In addition to the recognition of the school of medicine as an acceptable two year school, there have been two other important developments during the past year. First, is the decision of the board of higher education to build an addition to the present medical school building. Contracts have been let for an addition which will more than double the capacity of the present building. When completed, the building will provide adequate space for all the departments including the library, and also the state public health laboratory division. The plans for the new addition were almost complete when Drs. Smiley and Anderson, representatives of the two accrediting agencies, made their inspection of the school on October 1, 1951. The increased facilities which the new addition will provide undoubtedly influenced the inspectors in their decision to recommend full accreditation of the school.

The second significant development was the survey made by Deans Harold Lueth of Nebraska, Robert Lewis of Colorado and John W. Scott of Alberta, and Assistant Dean Theodore H. Harwood of Vermont. The inspections were made during the months of July and August 1951. The survey was designed to evaluate the present facilities of the University of North Dakota school of medicine, to discuss the plans for future development, and to review the possibility of integrating teaching potentials of medical services throughout the state. Numerous conferences were held with Dean Potter and the faculty of the medical school, physicians throughout the state—particularly in Grand Forks, Fargo, Jamestown, Bismarck, Minot and Rugby—and with several members of the laity who have had an interest in the development of the medical school during recent years. The complete report of this special committee of deans is available through Dean Potter's office and anyone interested is urged to obtain a copy and study it carefully. The recommendations include the following:

(1) "The survey team finds it difficult to understand the reason for a full time director of the medical center."

(2) The curriculum of the medical school should be carefully analyzed and reappraised in order that there can be a "shortening of the period of instruction at Grand Forks, so that during the second semester of the sophomore year, a four to six week period would be available for students to be assigned to the four principal medical centers of the state."

(3) "That consideration be given to strengthening the program in physical diagnosis by visits to the Grafton state school at Grafton, and using the available facilities at Fargo, so as to increase the scope of clinical experience of students." The available facilities at Fargo refer to the Veterans hospital and the Fargo clinic.

(4) "That a sound introductory clinical instructional program of four to six weeks duration at the end of the sopho-

more year be developed at Bismarck, Minot, Fargo and Grand Forks."

(5) "That coordinators of clinical instruction be appointed at each of the four centers to be charged with working with local physicians, clinics and hospitals, and with the dean to develop these introductory clinical courses."

(6) "That immediate steps be taken to construct the addition wing to the medical school, and to provide the necessary equipment and staff to furnish adequate instruction."

(7) "That no further thought be given to expansion to a four year curriculum until the new construction has been completed and sophomore clinical teaching in the several medical centers has become established and sufficient time has elapsed for a reliable assay of its success."

(8) "That, in the meantime, before any thought is given to the expansion of the curriculum of the University of North Dakota school of medicine to a four year program, serious consideration be given to the alternative of making a contractual arrangement with some other medical school or schools for the clinical instruction of students who have completed their sophomore year at the University of North Dakota school of medicine. The medical center could subsidize these students, in part at least, for the last two years of medical study at considerably less additional expense than would be required to operate a four year medical school."

The dean's report emphasized two points which have influenced the thinking of those in the state who have opposed the immediate development of a four year medical school. First, the lack of adequate clinical teaching facilities in Grand Forks. This would be a serious handicap particularly during the junior year when clerkship facilities should be available in Grand Forks under the immediate supervision of the teaching staff. The dean's report contains the following significant sentence, "Even after the completion of the hospital building program, the limited facilities of both clinical material and competent teachers does not make it possible to give the entire two year program satisfactorily within the city of Grand Forks." For this reason, the deans emphasize the necessity of developing a program of clinical instruction in the four larger centers in North Dakota in order that the graduates of the two year school will have had clinical instruction comparable to that available to students in other medical schools. Second, the deans are agreed that the one mill levy is adequate to cover the annual budget of a two year school but that "A minimal annual operating budget of $1,000,000, would be needed to give an acceptable four year training program, provided private hospitals and clinics would be willing to give full support to the teaching program, and would donate their facilities and personnel to this enterprise."

Those who have urged the immediate development of a four year medical school, based primarily on the contention that the situation of North Dakota is comparable to that in Vermont, should read the supplementary report which Assistant Dean Harwood of the University of Vermont school of medicine has written of his impressions resulting from his visit to North Dakota last summer. Although Dr. Hardwood seems to think there are adequate funds available in North Dakota to carry on a four year program (he previously had endorsed the statement regarding the need for almost twice as much money as is available and as contained in the statement quoted above) he stresses the availability of charity beds in Burlington, where the Vermont medical school is located, and the free dispensary which attracts patients from the entire state of Vermont. Obviously such facilities for clinical teaching are not available in North Dakota because there is no large body of ward patients anywhere in the state. Dr. Harwood concludes his report with the following statement, "If the problem of clinical material can be worked out, then North Dakota will be in a position to set up a program for the last two years of a medical school."

Dr. Hamre, chairman of the admissions committee of the school of medicine, appeared before the advisory council at its meeting in late January, 1952. In his report, Dr. Hamre pointed out that applications from qualified students are decreasing. There were only 48 qualified applicants on hand for the academic year 1952-53. It is obvious that this small number leaves little room for screening inasmuch as 40 students are to be admitted in the freshman class next fall. Dr. Hamre pointed out that this situation prevails in most medical schools which are subsidized by tax funds and in which priority is given to the residents of the state. The committee on admissions suggested that the quota could be filled with qualified applicants from outside the state, perhaps the neighboring states of Idaho, Montana, etc., where there are no medical schools. However, it was agreed that this would be unwise and every effort should be made to increase the number of qualified applicants from within the state. The discussion brought out the fact, also, that more qualified boys and girls in the state would apply for admission to the school of medicine if more student loan funds were available. The student loan fund of the ladies auxiliary will be helpful in this regard, and the members of the association should endorse and help promote the efforts of the auxiliary so that its student loan fund will grow. Physicians might also wish to make personal loans to worthy boys and girls who would otherwise be unable to go to medical school. The council agreed that more North Dakota boys and girls might be interested in applying for admission if publicity were sent to the high schools informing their students of the requirements for admission to the school of medicine and that the chances for qualified applicants to gain admission are excellent.

Recommendations:

Your representative on the medical center advisory council would urge the house of delegates to:

(1) Reaffirm its opinion that (a) the first essential is to strengthen the two year medical school, and (b) the development of a four year school in the immediate future be deferred;

(2) Pledge the support of the association in the decentralized clinical training program during the sophomore year as recommended in the dean's report, and urge the cooperation of its members who will be called upon to participate in the program;

(3) Urge the university administration, the dean, and the state board of higher education, to implement the recommendation of the deans with reference to the making of a contractual arrangement with some other medical school (or schools) for the clinical instruction of the graduates of the North Dakota school of medicine.

L. W. Larson, M.D., Member,
Medical Center Advisory Council

SPECIAL COMMITTEES

Emergency Medical Service

The committee on emergency medical service has held no meetings in the year 1951-52 and the following information has been formulated through written inquiries and the attendance of your chairman at the civil defense meeting held in Chicago this past winter.

The status of civil defense preparedness is good in Bismarck and Fargo. In Fargo, I am told, there has been a definite slump in public interest since their dry run several months ago. In Bismarck, the public interest has been stimulated as a result of the radar set-up in their vicinty. Medically, it is still a paper program which was set up last year and has not been changed.

The status of preparedness, medically, over the state is not known, inasmuch as the activities of the emergency medical service committee, since I have been a member of it, has been limited to unofficial discussions of the problem by the three members of the committee located in Bismarck. A meeting has been called, however, to be held during the annual meeting at Fargo, at 5 p.m., May 11, at the Moorhead Country club, and any member of the association interested in the civil defense problem, is invited to attend.

Fargo has had one practice run. In Bismarck, since the civil defense program was set up last year, the activities have been limited to called meetings of the civil defense committee and the activities associated with radar installation. There has been no information forwarded me from other communiities. As yet no manuals of instruction on the care of casualties have been prepared. The chairman of your committee knows only that the physicians of Bismarck and Fargo have received definite civil defense assignments—the status of other physicians throughout the state is not known and civil defense drills have been engaged in only in Fargo.

Inquiries have been directed to this committee inquiring as to the desirability of further medical civil defense conferences. It would be of value to the committee to hear the comments of the other members of the North Dakota State Medical association as to whether the conferences should be on a national, regional or smaller unit basis. North Dakota is an area 350,250 miles in extent, and its population is approximately 750,000. It has nine major communities varying in population from 8,000 to approximately 45,000, separated by 100 miles or more. Agriculture is the predominant industry and there are no military targets in North Dakota other than the transcontinental railroads and perhaps the radar installations, on which an enemy would waste an atomic bomb. If any of the communities were bombed, their area is so small that there would be no survivors and help would probably be unnecessary. Other emergencies in the past within the state have been cared for adequately by the Red Cross and the National Guard. It would seem to me that the main function of North Dakota in the civil defense program is one of support for strategic areas such as Minneapolis, for example, and for stockpiling of civil defense material.

R. W. Henderson, M.D., Chairman

Report to the House of Delegates by the Chairman of the Selective Service Advisory Committee

The following report is submitted to the house of delegates for their information. The state selective service advisory committee consists of Dr. Robert B. Radl of Bismarck, chairman; Dr. Russell Saxvik, state health officer, the other medical member; Dr. C. O. Fergusson of Jamestown, representing the dental profession, and Mrs. John Williams of Washburn, representing the nursing profession.

There is also, insofar as the medical profession is concerned, a selective service councillors advisory committee which consists of the councillors of the medical districts in the state of North Dakota. The state committee calls upon this committee for assistance in various problems.

This present report will refer only to physicians and surgeons. There are a total of 26 physicians of the first priority registered with North Dakota local selective service boards. The disposition of the 26 is as follows:

On active duty in the armed forces or in armed forces reserve—11.

1-A, available for induction unless he requests a commission—1.

2-A, (Essential in practice—nine located in the state of North Dakota and one in a hospital in Chicago.) There is only one instance in this group of essential physicians where the state selective service advisory committee recommended 1-A, but where the selective service system disagreed. This physician is in practice in a small town with no other physician in that area—10.

4-F—4.

It appears that at the time of preparation of this report, there is actually very little manpower available in priority one in the state of North Dakota. We do not at the time of the preparation of this report have information as to whether there will be calls in the near future or not. The only calls that have been issued were in July 1951.

We do not have any information at this time as to when second priority physicians might be called, but your group may be interested in what is available there for military service. At the present time, there are nine physicians under the jurisdiction of local boards in North Dakota in priority two:

1-A—1.

On active duty—1.

2-A, Both are in small towns and considered essential by the state advisory committee—2.

4-F—1.

Interns, whose status cannot be accurately determined until they have completed their internship, but who may be available for military service—2.

Robert B. Radl, M.D., Chairman

Industrial Health

Your committee recognizes the wide range of activities engaged in by the council on industrial health and especially with the importance of certain services as they relate to the defense industry. Industrial manpower conservation becomes all the more vital as the defense program finally swings into high gear.

The National Council on Industrial Health is very active and forwards frequent newsletters to your chairman relative to the many programs they are interested in—such as problems dealing with noise, chronic illness, the older worker, workmen's compensation, atmospheric pollution, and rehabilitation.

The previous suggestion that each district society have one meeting each year devoted to some phase of trauma is re-emphasized.

C. J. Glaspel, M.D., Chairman

Committee on Mental Hygiene

Although this committee met only once during the past year, much thought and time were given to the following recommendations.

1. Follow-ups on patients sent to the Jamestown state hospital should be sent back to the referring doctor immediately.
2. Members of the board of administration to meet with this committee in order to acquaint the board members as to what psychiatric care is.
3. Nurses should receive their psychiatric training in the state of North Dakota at the Jamestown state hospital instead of going out-of-state.

Besides these recommendations, the committee feels that the Jamestown state hospital is not availing itself of the services of the trained doctors of medicine in private practice in North Dakota for aid in improving the medical facilities at the institution.

The committee believes that these recommendations will result in not only better mental health in North Dakota but will pave the way for a definite financial saving.

L. H. Fredricks, M.D., Chairman

SUB-COMMITTEE ON MENTAL HEALTH

In this first report by the sub-committee on mental hygiene, our president requested a report to come before the association relative to the problem of alcoholism in our state and with particular reference to the medical association cooperating with the state commission on alcoholism as establsihed at the last legislature in 1951.

House bill 617 is an act relating to alcoholics and alcoholism, providing for the creation of a state commission on alcoholism to study and disseminate information on alcoholism and to treat and rehabilitate the victims thereof on a voluntary basis and providing for an appropriation.

House bill 690 is an act making an appropriation for the expenses for the department of public instruction in setting up courses of instruction concerning the nature of alcoholic drinks and narcotics and their effect upon the human body.

It would not be fair to approach the problem of alcoholism with the sweeping statement of Bertha Rachel Palmer as taken from the National Temperance Quarterly, "An alcoholic mother gives to the world either a prostitute or a delinquent when she does not give an epileptic, an idiot or a lunatic." The problem should rather be approached by (1) research, (2) education, and (3) rehabilitation.

In 1940 in the percentage consumption of alcohol, North Dakota rated 45th among the 48 states while in 1945 it ranked 18th. The national committee on alcoholism estimates that there are about 65 million people in the United States who drink alcoholic beverages, at least occasionally. Only 4 million of them, however, have found that the use of alcohol constitutes a problem in their lives and 750,000 of them are chronic alcoholics. In North Dakota a conservative estimate is that we have 3,000 alcoholics.

Of this tremendous number only a small percentage ever consult a physician about their dilemma. Responsibility for this apathy, I believe, rests not with the alcoholic himself, but with the medical profession. The attitude of most doctors, in past years, has relegated these sufferers to the limbo of the social pariah with an unwarranted stigma attached. For too long they have been ridiculed, shouted at, preached to, punished or jailed—as though any of these measures were ever effective in helping a sick person recover from an illness.

It was at this point that a group of men afflicted with the malady found a way of helping themselves—by helping one another and organizing Alcoholics Anonymous. If laymen without technical experience could arrive at such a formula, certainly trained minds with a knowledge of anatomy, pathology, physiology, chemistry and psychiatry should be able to evolve some treatment for these people. It is the responsibility of the medical profession to do the job.

It has been generally recognized by research workers on alcoholism, by psychiatrists, psychologists and others interested in the problem that: (1) the alcoholic is a sick man, (2) the alcoholic can be and is worth helping, (3) alcoholism is both a medical and public health problem.

A large proportion of the general practitioners have remained indifferent to the problems of the alcoholic. The general practitioner must be persuaded to accept the above concepts for he is the middle man between scientific research and the public. As long as he is not convinced his non-cooperation will constitute a serious obstacle to the complete winning of the public.

The alcoholic is a sick man. He must be treated as a sick man. When the economic loss in this country through this illness runs to about a billion dollars annually, it is revealing to note that less than a million dollars is spent on the proper treatment of these people. The loss in human suffering and the effect upon their families can not be computed in dollars. Surely with this tremendous waste, it is fitting that the doctor devote his time and effort in treating these sick people, so that they can recover and lead healthy and well integrated lives.

Treatment of the acute phase of alcoholism is the same, practically, as the treatment of any acute intoxication. Recovery from the acute phase is only the initial step, the rehabilitation of such an individual, which requires a great deal more time, is the criterion of the cure. Perhaps the most effective treatment in the rehabilitation of the alcoholic is that which is effective with other neurotic patients; a philosophy of living, which is compatible with the individual and his family; an absorbing faith in hismelf which comes only after he has learned to understand himself and a close association with others whose experience parallels his own. The physician's co-operation with Alcoholics Anonymous is one way of obtaining this help for his patient.

The prime theme of any public health program is prevention—primary prevention which implies avoidance of the disease in question and secondary prevention which calls for arrest of the course of the existing disease.

Primary prevention requires a program directed at potential drinkers—an intensive public educational activity directed at improving the adjustment of children and adults in their homes. Here the schools, churches, health agencies and other organizations can be of great help. Apparently House bill 690 had such a program in mind.

Secondary prevention should include the facilities offered by alcoholic out-patient clinics where the services of a psychiatrist or psychologist or even a trained social worker would be available—or a rehabilitation center completely staffed by Alcoholics Anonymous. These fellows have suffered the agonies of drink and they understand the problems of their brothers.

North Dakota, through the State Alcoholics commission, has established a rehabilitation center at Minot. It is known as North Dakota State Lodge and is completely staffed by Alcoholics Anonymous members who are anxious and willing to help recover a broken soul.

Surely the North Dakota State Medical society is willing to support and encourage the development of such a program which is attempting to restore men and women to healthy, happy and useful lives.

D. J. Halliday, M.D., Chairman

Committee on Displaced Physicians

The North Dakota state board of medical examiners should be given a lot of credit for the way they handled the delicate problem of the displaced physician. It's true that the program is a long way from being perfect, but at least it was an honest effort to do something. Problems have arisen, but they have all been solved. Practically all of the displaced physicians who have been brought to North Dakota have served their required one year's internship and have appeared before the board. Those who passed were allowed to practice in rural areas. Those failing to pass the boards were allowed to appear before the board again after another year's internship. At present there are about six physicians under the D.P. program still seeking licenses to practice. When these are disposed of, the D.P. program will be closed to further applicants, since there no longer seem to be available places in which to place these men.

Various members of the state board are assigned the supervision of any D.P.'s practicing in their locality. It is not the intention of these members to act as a gestapo and spy on every move made by a displaced physician, rather they are to review the attitude of the community toward the doctor and the general attitude of the physician to his practice. A report is to be made at every meeting of the board. The board will again examine each D.P. after he becomes a citizen. It is thus felt that at all times the entire situation will be kept well in hand.

The cooperation of the sponsoring agencies remains very good. This in a large measure assured the almost perfect working of the whole program.

O. A. Sedlak, M.D., Chairman

Committee on Diabetes

The committee on diabetes again this year organized the annual diabetes detection drive as part of National Diabetes week, with the cooperation of the American and North Dakota diabetic associations. This committee is largely composed of representative members of constituent district medical societies of the state medical association. Needless to say, considerable time and effort had to be expended to set the program in motion, including correspondence, obtaining materials, volunteers, telephone calls, publicity, etc.

According to established policy, each district medical society was asked to vote for or against having its own local detection drive. Nearly all societies voted in favor of local drives. (Over 600 societies throughout the nation responded similarly.)

The Ames Chemical company is to be commended for supplying over 1,000,000 "Clinitest" tablets free of charge to all participating district medical societies throughout the nation without any fanfare.

Expenses for state-wide coordination and certain other materials were defrayed by a small grant from the state medical association ($100). For those societies requiring paper specimen cups, a portion of the expense was defrayed by the state public health service and the committee wishes to thank Dr. Russell O. Saxvik for his kind cooperation.

Throughout the state a total of 12,873 free urine tests were performed and 325 cases of glycosuria were discovered. However, only 275 of these positive cases have thus far reported to physicians for further investigation, despite a concentrated effort to induce them to see their family physicians by means of follow-up letters and telephone calls. Among the "positives" adequately studied, only 29 have been reported as definite cases of diabetes thus far. (A number of reports have not as yet been received.) Twelve of these were previously known diabetics. The discovery of only 17 previously unknown cases of diabetes among 12,873 people is, of course, appallingly low. A conservative estimate would be that at least 75 new cases actually exist among this number of people. This incidence has been repeatedly confirmed under more carefully controlled studies. Doubtless many more cases will be reported, but a number of physicians failed to notify their local committees of the final outcome in cases they have investigated.

Thirteen cities participated in the drive—November 11-17, 1951. Local drives and the respective chairmen of committees on diabetes detection were as follows:

Wahpeton, Dr. E. J. Beithon; Garrison, Dr. Martin Hochhauser; Jamestown, Dr. T. E. Pederson; Valley City, W. H. Gilsdorf; Fargo, E. M. Haugrud; Dickinson, A. J. Spanjers; Williston, Dr. A. K. Johnson; Larimore, Dr. A. C. Kohlmeyer; Bismarck, Dr. G. D. Icenogle; Grand Forks, Dr. G. G. Thorgrimsen; New Rockford, Dr. G. W. Seibel; Minot, Dr. Martin P. Conroy; Devils Lake, Dr. R. M. Fawcett.

It is of importance that a significantly higher number of glucose tolerance tests were performed in follow-up investigations than were done last year, since it is well known that early diabetes is not infrequently characterized by a normal fasting blood sugar.

There are several reasons why the 1951 detection drive in North Dakota was not as successful as the previous campaign. First, people who were tested the previous year feel a sense of false security, believing that another test is unnecessary. Second, publicity was less vigorous in the recent drive. Third, some local committees either got a late start or for some reason could not carry their programs through. Distribution of containers throughout a community with printed instructions has repeatedly proven more effective than other methods.

There has been some discussion to the effect that detection drives should not be held every year. The national committee on detection and education of the American Diabetes association is most anxious to continue annual diabetes detection drives (and year-round diabetes detection programs). Perhaps their point is well taken when we consider the hundreds of mobile chest x-ray units roving the country in search of an estimated 150,000 undiscovered cases of tuberculosis, and yet seven times this number of undiscovered diabetes cases exist. The early recognition of diabetes is even more important than that of tuberculosis since the former is a lifelong incurable disease, on the increase, and which by early recognition can be reduced to a relatively innocuous state. In addition to this, immeasurable good will has been established by this gratuitous service to the public by the medical profession—something we need more of in the light of poliical trends in Washington.

It would seem, therefore, that what we need is not fewer detection drives, but more strategic planning and more intensive follow-up programs in the future to unveil and rescue the hidden diabetic. It is hoped that in the future your committee on diabetes may succeed in accomplishing these objectives.

E. A. Haunz, M.D., Chairman

New Business

Dr. Spear invited comment on the first order of business which was to set the per capita dues for the ensuing year, inasmuch as it is the custom to have this decided on the floor of the house of delegates. It was moved and seconded by Dr. Youngs and Dr. Radl that the dues be $50 for the ensuing year. A question was then raised by Dr. Fortney regarding the changing of the dues and another question by Dr. Halliday regarding a registration fee which would include the banquet or entertainment. In view of these discussions, the motion regarding the dues was withdrawn and the matter tabled until the second session.

The next order of business was the appointment of a nominating committee by the president, Dr. W. E. G. Lancaster. The names of the nominating committee were read by Dr. Boerth, and are as follows: Dr. R. W. Rodgers, chairman, and Drs. M. S. Jacobson and W. A. Liebeler.

Adjournment

Speaker Spear next asked to have announcement from the various chairmen of the reference committees as to the time and place of the committee meetings. These were stated and it was moved and seconded that the first session of the house of delegates adjourn to reconvene at 2:30 p.m., Sunday afternoon.

SECOND SESSION, HOUSE OF DELEGATES

Sunday Afternoon, May 11, 1952

Fargo, North Dakota

The second session of the house of delegates was called to order at 2:30 p.m., May 11, 1952, in the South room of the Gardner hotel, Fargo, North Dakota.

Dr. Haugrud, chairman of the credentials committee, reported that there was a quorum present. The following doctors answered the roll call:

A. C. Fortney, Fargo; O. A. Sedlak, Fargo; E. M. Haugrud, Fargo; C. V. Bateman, Wahpeton; N. A. Youngs, Grand Forks; Charles Graham, Grand Forks; George Waldren, alternate, Cavalier; J. D. Craven, Williston; D. J. Halliday, Kenmare; F. R. Erenfeld, alternate, Minot; W. H. Gilsdorf, Valley City; M. S. Jacobson, Elgin; R. B. Radl, Bismarck; R. O. Saxvik, Bismarck; R. W. Rodgers, Dickinson; Thomas Pederson, Jamestown; K. G. Vandergon, Portland.

The reading of the minutes of the first session was dispensed with upon motion of Dr. Radl, and seconded by Dr. Youngs.

Selection of 1953 Meeting Place

The Speaker announced that he would be glad to entertain an invitation for a place for the 1953 meeting to be held. Dr. Halliday extended the North Dakota State Medical association an invitation from the Northwest District Medical society to meet in Minot for its 1953 session. This motion was seconded by Dr. Erenfeld and unanimously passed.

Report of the Nominating Committee
Election of Officers

Dr. Rodgers, chairman of the nominating committee, presented the following report.

Dr. Rodgers: The nominating committee wishes to submit the following nominations:

President	O. W. Johnson, Rugby
President-elect	J. Sorkness, Jamestown
First vice-president	P. H. Woutat, Grand Forks
Second vice-president	D. J. Halliday, Kenmare
Speaker of the house	A. E. Spear, Dickinson
Vice-speaker of the house	G. A. Dodds, Fargo
Secretary	E. H. Boerth, Bismarck
Treasurer	E. J. Larson, Jamestown
Delegate to A.M.A.	W. A. Wright, Williston
Alt. Del. to A.M.A.	G. W. Toomey, Devils Lake

Councillors:

Second district	J. C. Fawcett, Devils Lake
Seventh district	R. D. Nierling, Jamestown
Ninth district	A. R. Gilsdorf, Dickinson

Board of Medical Examiners:

C. J. Glaspel	Grafton
W. E. G. Lancaster	Fargo
V. J. Fischer	Minot

Member, Medical Center Advisory Council:

L. W. Larson	Bismarck

Member, State Health Council:

M. S. Jacobson	Elgin

R. W. Rodgers, M.D., Chairman
M. S. Jacobson, M.D.
W. A. Liebeler, M.D.

The Speaker announced that a motion would be in order to declare the nominees duly elected to their respective offices. On motion made and seconded that the nominees be elected unanimously, all voted aye and the above officers were elected unanimously.

REPORTS OF REFERENCE COMMITTEES

Reference Committee to Consider the Report of the President, Secretary and Special Committees

Dr. Youngs, chairman, presented the following reports and their discussions, which were adopted section by section, and as a whole:

1. *Report of the President.* Your reference committee has reviewed the report of the president. We have noted Dr. Lancaster's comments on the past and present executive secretaries, the need for closer cooperation between the various districts in the state association, and his various official appearances before professional and lay organizations.

We especially note his comment regarding the increased cost of our annual meetings, and his suggestion that the cost of the banquet and refreshments be charged to the individual, rather than being paid by the state association. To follow his suggestion, we recommend that a $5.00 registration fee be charged to include the banquet and incidentals.

We agree that the president should have full cooperation of the members requested to act on committees and that they should signify their intent before being appointed.

The president suggests that a permanent date for our annual meeting be set, such as the second Saturday in May. We feel that there are many advantages to such a proposal and we recommend that this be done.

Your committee feels that Dr. Lancaster has done an outstanding job as president of the North Dakota State Medical association, and suggests that the house of delegates give him a rising vote of thanks.

This portion of the report was adopted and the house of delegates gave a rising vote of thanks to Dr. Lancaster.

Following this report came a discussion on the suggestion that $5.00 be charged as a registration fee at subsequent meetings and be used at the discretion of the convention committee to cover the banquet and incidental charges. Motion was made and seconded that this be put into effect.

Dr. Lancaster's suggestion that a permanent date for the annual meeting was next discussed. This was found to have many advantages and the chairman recommended that such be done. The motion was made by Dr. Gilsdorf and seconded by Dr. Radl, that the permanent date of the second Saturday in May be set for the annual meeting. Motion carried.

2. *Report of the Secretary.* The report of the secretary was thoroughly reviewed, and it was urged that the secretaries of the various district societies emphasize the need of cooperation to their various members to forward their dues to them as early in the current year as possible. This portion of the report was adopted.

3. *Report of the past Executive Secretary.* The committee expressed its regret of the resignation of E. Forsyth Engebretson and expressed their appreciation for the excellent work he has done for the state association.

4. *Report of the Executive Secretary.* The committee reviewed the report of the new executive secretary, Mr. Lyle A. Limond, and took the occasion to welcome him to the association, assuring him of the full cooperation of the membership.

5. *Special Committee on Emergency Medical Service.* The committee reviewed the report of the special committee on emergency medical service and commended this committee on its report, concurring with their conclusions.

6. *Special Committee on Mental Health.* The committee recommends that the medical association and its individual members support and encourage the program of the state commission on alcoholism, as outlined in the report.

7. *Special Committee on Displaced Physicians.* The committee wished to compliment the board of medical examiners for the diplomatic way this difficult situation was handled.

8. *Special Committee on Diabetes.* The committee reviewed the report of the special committee on diabetes and wished to compliment the committee, and particularly its chairman, on the excellent work they have done. They agreed there is a need for more strategic publicity and more intensive follow-up programs annually.

N. A. Youngs, M.D., Chairman
D. J. Halliday, M.D.
M. S. Jacobson, M.D.
R. W. Rodgers, M.D.

Reference Committee to Consider the Reports of the Council, Councillors, Delegate to the A.M.A. and Member of the Medical Center Advisory Council

Dr. W. H. Gilsdorf, chairman, presented the following report which was adopted section by section and as a whole:

1. *Report of the Chairman of the Council.* The report of the chairman of the council was reviewed by the committee and found very complete.

The committee was pleased to note the establishment of scholarships at the medical school of the university.

The committee concurs with the appropriation of the sum of $3,000 for the use of the committee on public policy and legislation for the purpose of developing better public relations, and would suggest the active initiation of this program in the fall and winter of this year, at the time of maximum radio coverage.

The committee concurs with the council on granting the sum of $500 to be used by the sub-committee on rural health in surveying rural hospitals.

Your committee approves the cautious consideration of utilizing a portion of our reserve in the establishment of a student loan fund. The committee suggests that the council consider the possibility of the North Daktoa State Medical association contributing to the Medical Auxiliary student loan fund, in preference to establishing their own loan fund.

The committee also feels that the council should consider the investing of state funds in guaranteed securities yielding more than 1 per cent interest.

The committee approves the efforts of the council in the attempt to initiate a uniform insurance report blank.

The committee regrets the resignation of E. F. Engebretson, and commends the council in their speedy action in selecting our new executive secretary, Mr. Limond.

The committee is pleased to note the large number of scientific meetings held during the year, as reported in the reports of the councillors, and is pleased with the great interest shown.

2. *Report of the Member of the Medical Center Advisory Council.* The committee is pleased to note that the two-year medical school at the university, as reported in the report of the member of the medical center advisory council, has now been fully accredited due to the great work of the school authorities, the medical advisory council, and the board of higher education.

We are also pleased to see that the board of higher education is cognizant of the need for furthering the physical facilities at the existing school.

The committee agrees wholeheartedly with the opinions offered by the member of the medical center advisory council, namely:

1. That the first essential is to strengthen the two-year medical school, and that the development of a four-year school in the immediate future be deferred.
2. Pledge the support of the association in the decentralized clinical training program during the sophomore year as recommended in the dean's report, and urge the cooperation of its members who will be called upon to participate in the program;
3. Urge the university administration, the dean, and the state board of higher education, to implement the recommendation of the deans with reference to making a contractual arrangement with some other medical school (or schools) for the clinical instruction of the graduates of the North Dakota School of Medicine.

W. H. Gilsdorf, M.D., Chairman
F. R. Erenfeld, M.D.
Thomas Pederson, M.D.

Reference Committee to Consider Reports of the Standing Committees Except the Report of the Committee on Medical Economics and Its Sub-Committees

1. *Report of the Committee on Medical Education.* The committee wishes to commend the committee on medical education for its excellent report. Since most of the recommendations are incorporated in the report of the member of the medical center advisory council, these recommendations will be referred to that particular reference committee to consider the report of the member of the medical center advisory council.

2. *Report of the Committee on Crippled Children.* The committee reviewed the report of the committee on crippled children and approved it in its entirety.

3. *Report of the Committee on Official Publication.* The reference committee reviewed this report and approved it.

4. *Report of the Committee on Necrology and Medical History.* The reference commttee moved the adoption of this report and asked that the house of delegates have a moment of silence in reverence and respect in memory of those who have passed on.

5. *Report of the Committee on Public Health.* This report was reviewed and the problem of rabies was again found to be of considerable importance. It is strongly recommended that the department of public health disseminate all available information to physicians as soon as possible, especially information regarding the contra-indication in the use of anti-rabic vaccine.

6. *Report of the Committee on Maternal and Child Welfare.* The reference committee commends this report and specifically recommends the adoption of the recommendation that North Dakota physicians actively support the local program of fluoridating municipal water supplies, according to prescribed standards.

7. *Report of the Committee on Cancer.* The reference committee highly commends the committee on cancer, not only for its report but for the fine program of bringing cancer clinics to the district medical societies.

8. *Report of the Committee on Fractures.* The committee reviewed and approved this report.

9. *Report of the Committee on Public Policy and Legislation.* The report of the committee on public policy and legislation was thoroughly reviewed. In view of the fact that there was so much uncertainty as to what type of public relations program should be carried out, it is the recommendation of the reference committee that the entire matter again be placed in the hands of the committee on public policy and legislation as to what course they should follow.

10. In regard to the formation of a grievance committee,

it is the recommendation of this committee that the house of delegates again appoint the five past presidents of the association to act as a grievance committee, and that they be delegated to formulate plans for a permanent committee.

It was requested by Dr. Berg that a supplemental report of the committee on medical education be presented to the committee on resolutions.

O. A. Sedlak, M.D., Chairman
J. D. Craven, M.D.
K. G. Vandergon, M.D.

Reference Committee to Consider the Reports of the Committee on Medical Economics and Sub-Committee on Prepayment Medical Care, Veterans Medical Service and Rural Health

Dr. R. B. Radl, chairman, presented the following report, which was adopted section by section and as a whole:

1. *Report of the Committee on Medical Economics.* The reference committee reviewed the report of the committee on medical economics as printed in the handbook, as well as the supplemental report. These recommendations will cover the report in the handbook and the supplemental report:

Insofar as the group disability insurance program is concerned, the committee as a whole, after investigation and detailed consideration of other programs, recommends the following:

1. That the house of delegates approve the principle of the state association entering into a group disability insurance agreement.

2. That they approve the policy offered by the Metropolitan Casualty company of New York, and

3. That the house of delegates instruct the officers of the state association to take the necessary steps to complete such an agreement with the Metropolitan Casualty company in the immediate future.

4. The reference committe has not committed itself as to the possible variations in lapse of days before beginning coverage.

There was some discussion by the members of the committee on medical economics and the representatives of the Metropolitan company. They will be glad to quote us figures as to the change in the rate of the premium. The company also stated that they wished to have a 50 per cent quota among the state association members to enter this plan.

The committee recommends acceptance of Mr. Swomley's plan regarding the organization with the radiologists for interpretation of x-ray films paid for by the state tuberculosis association.

Insofar as the adoption of a uniform insurance form is concerned, the committee recommended with emphasis the points in the supplemental report.

In regard to the workmen's compensation bureau's fee schedule changes, it was decided to await further action on the part of the bureau and for a study of their actuary.

It appears from a review of the situation that physicians throughout the state and the welfare boards are cooperating satisfactorily without a set fee schedule.

The reference committee approves the suggestion of the committee on medical economics in their supplemental report regarding fees for chest surgery in the Indian service.

2. *Report of the Sub-Committee on Prepayment Medical Care.* It is the opinion of the committee that it is not within the province of the medical association to recommend any particular insurance company or plan, but our support should be given to any sound plans in the best interest of the patient and hospital.

3. *Report of the Sub-Committee on Veteran's Medical Service.* The committee reviewed this report and the following points are noted:

1. That important changes in the past year consist of conversion to a cash basis, and balancing the budget, both of which are well covered in the report.

2. The report emphasizes that some of the fees have been raised.

3. The report further emphasizes the large part the veterans service has played in decreasing the work of the already overloaded and under-staffed veterans hospitals within the state.

4. That the veterans medical service continue to act as the intermediary body between the Veterans Administration and the members of the North Dakota State Medical association.

It appears that the present work load on the physicians in North Dakota could be increased several times to relieve possible future demands made upon the Veterans Administration.

4. *Report of the Sub-Committee on Rural Health.* The reference committee reviewed the report submitted by Dr. M. S. Jacobson, chairman of the sub-committee on rural health and your committee has given special consideration to the following items:

1. As authorized last year, plans have been laid for a survey of hospitals and health facilities in rural North Dakota. The survey was not completed due to difficult roads and bad winter weather. The survey will be made in towns of 2500 population and under.

2. An exceptionally fine and complete survey outline is included in the report covering numerous details regarding the economic administration of rural hospitals and medical practice.

3. Joint meetings were held with the public health association and plans were made for a panel discussion on rural health problems in North Dakota. Arrangements are being made to hold another joint session October 10-11, 1952, with the public health association.

4. The chairman, Dr. Jacobson, attended the national rural health conference in Denver in February 1952.

The committee is very appreciative of the time and thoughtful effort that Dr. Jacobson has spent in the preparation of this report and recommended that he continue as chairman of this committee on rural health.

R. B. Radl, M.D., Chairman
Charles Graham, M.D.
G. W. Toomey, M.D.
A. K. Johnson, M.D.

Reference Committee on Resolutions

Dr. A. C. Fortney, chairman, presented the following report which was adopted section by section and as a whole:

The committee on medical education has prepared two resolutions which they presented to our committee on resolutions to have adopted at this session of the house of delegates. These are as follows:

RESOLUTION

Whereas there is a real need to have our North Dakota youths more adequately instructed in matters of health by well informed teachers;

And whereas, the presidents of the state teachers colleges have signified their desire to have such courses in health education conducted this summer in their regular summer school sessions ,

And whereas, this type of education can be jointly developed with the North Dakota State Dental association;

Now, therefore, be it resolved, that this health education program be inaugurated under the direction of the dean of the medical school and under the auspices of the medical center with the assistance of the state health department and the doctors of the state.

RESOLUTION

Whereas, the North Dakota legislative assembly will meet in session this January 1953 and will, undoubtedly, discuss health matters;

And whereas, certain legislative health problems are already in evidence;

Now, therefore, be it resolved, that this association establish a liaison with other interested groups and organizations to assist the legislators in promoting legislation which will be in the best interest for the health of the peoples of North Dakota.

RESOLUTION

Whereas, the sixty-fifth annual meeting of the association being held in the city of Fargo has received the courteous and friendly convenience and cooperation which is traditional to this city;

And whereas, the mayor, the Honorable Murray Baldwin, the Fargo chamber of commerce, the several hotels and others of Fargo have actively assisted in making this session both enjoyable and successful;

Now, therefore, be it resolved, that the house of delegates of the North Dakota State Medical association do express their sincere appreciation by directing a copy of this resolution to Mayor Baldwin for the city of Fargo.

RESOLUTION

Whereas, this house of delegates has been solicited by the North Dakota Association of Sanitarians, to support a proposal to implement a registration law for all sanitarians in this state,

And whereas, the proposed registration act would require the sanitarian to be well qualified and to be certified through examination by a board of examiners;

And whereas, this type of registration will tend to release sanitarians from political pressure; to cause the formation of a new sub-professional class; and creation of a new examining board,

Now, therefore, be it resolved, that this association be recorded as in favor of upgrading the standards of the sanitarians in order to bring a higher degree of competence among all individuals engaged in the sanitary control of our environment.

RESOLUTION

Whereas, the Woman's Auxiliary of the North Dakota State Medical association, under the capable leadershp of Mrs. R. W. Rodgers of Dickinson, have continued to be most willing workers when called upon to promote better public relations in their several communities,

And whereas, they have continued in their efforts to successfully promote the assistance program known as a student loan fund to the medical students of the University of North Dakota medical school,

And whereas, they have continued to make important contributions to civil defense and blood bank projects,

Now, therefore, be it resolved, that the house of delegates of the North Dakota State Medical association warmly congratulate and commend them for their efforts.

RESOLUTION

Whereas, the sixty-fifth annual meeting of the North Dakota State Medical association has been presented with a most notable and educational scientific program, as well as a most refreshing entertainment schedule,

And whereas, the First District medical society, Dr. W. E. G. Lancaster, state president, Dr. G. W. Hunter, general chairman, and others on the several program and entertainment committees served so well to insure us of this most creditable annual meeting,

Now, therefore, be it resolved, that the house of delegates, by a rising vote of thanks, signify their gratitude and appreciation.

The final action of the house of delegates was the fixing of per capita dues for the ensuing year.

It was moved and seconded by Drs. Youngs and Radl that the dues remain at $50 for the ensuing year, and the motion carried.

Following a word of appreciation by the Speaker, Dr. Spear, for the cooperation of all the members of the house of delegates and the members of the various reference committees at the session, the motion was made and seconded that the session be adjourned sine die at 4:00 p.m.

SCIENTIFIC PROGRAM

Monday, May 12, 1952

City Auditorium, Fargo, North Dakota

8:30 to 9:30 a.m.—Registration.

9:30 to 10:00 a.m.—"Results of miniature chest survey in North Dakota," H. M. Berg, M.D., Bismarck.

10:00 to 10:30 a.m.—"Roentgen diagnosis of benign gastric ulcers," Harold O. Peterson, M.D., Miller hospital, St. Paul, Minnesota.

10:30 to 10:40 a.m.—Address of welcome—The Honorable Murray Baldwin, mayor, city of Fargo.

10:40 to 11:00 a.m.—Intermission.

11:00 to 11:30 a.m.—"Extemporaneous discussion on common causes of hematuria and their treatment," Frederick F. B. Foley, M.D., St. Paul, Minnesota.

11:30 to 12:00 a.m.—"Common problems in office gynecology John A. Haugen, M.D., Minneapolis, Minnesota.

2:00 to 2:30 p.m.—"Newer concepts in the treatment of infectious diseases in children," Franklin Top, M.D., Minneapolis, Minnesota.

2:30 to 3:00 p.m.—"Small bowel tumors," Robert Nuessle, M.D., Bismarck.

3:00 to 3:30 p.m.—Intermission.

3:30 to 4:00 p.m.—"Management of the cross-eyed child," T. G. Martens, M.D., Rochester, Minnesota.

4:00 to 5:00 p.m.—"Fracture clinic," E. C. Henrikson, M.D., Daniel Moos, M.D., and M. C. Nelson, M.D., Minneapoils, Minnesota.

Tuesday, May 13, 1952

City Auditorium, Fargo, North Dakota

9:00 to 9:30 a.m.—"Salient points of an autopsy," James D. Cardy, M.D., Grand Forks.

9:30 to 10:00 a.m.—"Management of bleeding lesions of the digestive tract," J. A. Bargen, M.D., Rochester, Minnesota.

10:00 to 10:30 a.m.—"Diagnosis and treatment of benign and borderline breast lesions," O. J. Campbell, M.D., Minneapolis, Minnesota.

10:30 to 11:00 a. m.—Exhibit time.

11:00 to 11:30 a.m.—"The blood pressure problem," Edward L. Bortz, M.D., Philadelphia, Pennsylvania.

2:15 to 3:15 p.m.—Presidential address—Dr. W. E. G. Lancaster, Fargo.

Inaugural address—Dr. O. W. Johnson, Rugby.

Introduction of Fifty-Year club members. (Dr. Lancaster introduced the new members of the Fifty-Year club of the North Dakota State Medical association to the doctors, guest speakers and others in attendance at the scientific session. The following three were so honored: Dr. LaRose, Bismarck; Dr. Gronvold, Fargo, and Dr. Vinge, Hillsboro.)

3:15 to 3:45 p.m.—"Recent advances in the diagnosis and treatment of diseases of the thyroid," Ray F. Farquaharson, M.D., Toronto, Canada.

3:45 to 4:00 p.m.—Exhibit time.

4:00 to 5:00 p.m.—"Panel discussion on the clinical problem of jaundice," Ray F. Farquaharson, M.D., moderator; O. J. Campbell, M.D.; J.A. Bargen, M.D., and James D. Cardy, M.D.

5:00 p.m.—Drawing for door prize.

PRESIDENTIAL ADDRESS

W. E. G. Lancaster, M.D.
Fargo, North Dakota

Members of the North Dakota State Medical association, distinguished guests, ladies and gentlemen:

As our annual convention marks the passing of another year, it is well that we pause and re-examine our status in a world of changing concepts, both economic and sociologic. As we contemplate the coming elections, we must subconsciously, at least, wonder what the future has in store for our nation. Grave problems and dangers confront us. The greatest danger of all, however, lies in the fact that so many people in America do not recognize or understand the true situation. If we ever lived in a "fool's paradise," I am sure that time is now.

For a second time in this century, we face an uncertain and confused future. Again, the problem of peace and settlement to which we put our hands after victory, remain unsolved. After winning World War II, just six years ago, at great cost in lives and resources, and then losing the peace, we are now in a shooting war with the communists which our military leaders say we cannot win at the present time. The stale-mated, unending, half-way war in Korea is bleeding us of our finest manhood, Korean losses well over 100,000 casualties, an estimated 6,000 American prisoners of war brutally slaughtered.

Along with these hard-to-take facts, we see Russia ruling a billion people, possessing the atom bomb and a bigger air force and submarine fleet than we have. Our government is taking approximately 30 per cent of the national income in taxes. The national debt is upward of 260 billions.

Inflation is crippling the purchasing power of the dollar. In fact, the dollar is worth less today than at any time since the constitution was adopted, 162 years ago. Inflation is undermining thrift and endangering our whole economic life and government policies are feeding inflation, not heading it off.

You see very little willingness in Washington to institute a program of economy.

Nearly 25,000,000 people are now regularly getting checks from the government. More and more people are getting the "gimme" disease. The virtue of self-reliance that built America is becoming a casualty of the times. It now requires 2,500,000 civilian workers to staff the Federal Bureaucracy, their salaries alone amounting to $8 billion a year.

Studies made among school student bodies in many sections of the nation in 1951 indicate that our schools and colleges are turning out young men and women who, though well qualified along special lines, are not well educated—are not aware of the comparative advantages of the American economic system, do not understand how it works and are, therefore, easy marks for the propagandists seeking to change our way of life to a government operated welfare state. Nation-wide polls show the adult population to be woefully uninformed on economic facts.

Morality in public life is at an all-time low. Federal taxes in many sections have been fixed for political favorites and for bribes. Gangsters and racketeers have gained political respectability through party contributions. Corruption, dishonesty, and dishonor have made a dirty trail through the government. Political parasites have become rich and few have been brought to the bar of justice. This gentlemen, is the world we find ourselves living in today and I repeat the problems and dangers confronting our nation are grave and the gravest of all is public apathy, and we doctors are part of that public. In reading the University of Colorado Curriculum Bulletin, I ran across this statement, "The physician has a responsibility to understand his patient as an individual and as a member of society. He also has a responsibility to prepare to assume the position of leadership in his community which is expected of him by the public." Right here, gentlemen, is where we, as a group, have fallen down. At a meeting of the North Dakota Hospital association in Grand Forks a few weeks ago, I sat next to a Grand Forks merchant who took part in the program and who very emphatically told me, "You doctors will get nowhere until you come out and assume your share in civic responsiblity—and why don't you lay off that worn-out alibi that you are too busy." "You never seem too busy to do the things you want to do." He was rubbing the fur the wrong way, but I was at least getting a layman's viewpoint and after giving it a good deal of thought, I believe there is much truth in it. To judge ourselves still further, we might ask ourselves a few questions. How much time have I spent serving on civic projects? How much have I contributed toward civic causes? What service and contribution towards better government? What has been my interest in public welfare?

I think I am safe in saying that we have come to the realization that we do not command the respect of the public, held by doctors a generation ago. That statement is verified by the formation of grievance committees and by the development of public relations programs. Probably no profession or group is more vitally concerned with human relations and public relations than the medical profession—and have done less about it. May I ask your indulgence for just a moment of reminiscing to make a point that I think is extremely important. I can vividly recall our old family doctor, forty years ago, in a small town where I was raised. When one of the family became ill enough to call a doctor, it was quite an event. His call was more in the nature of a social call than a professional one, and I am sure that old Dr. McKenzie would not be considered very learned in the light of our present-day knowledge. However, he always had time to sit in front of a baseburner, sip a cup of tea, eat a few cookies, and before leaving he would produce some vile tasting medicine from his black bag, and soon we were well again.

There was certainly no reason at any time for a discussion of proper attitudes and methods of handling patients by his office personnel. He had no office personnel. He never attended medical meetings to hear a discussion on his responsibility to his patients. It was just understood that when anybody became ill at any hour of the day or night, he responded. His services might entail sitting by the bedside all night, but his responsibility did not end until the illness was terminated. It was never necessary to make any interpretation of medical care cost to any of his patients, nor to arrive at a mutual understanding of finances as we do today.

These subjects are products of a new era in the practice of medicine. His fees were always in keeping with the financial circumstances of his patient and I doubt if any of his patients ever thought a fee was exorbitant. If they couldn't afford to pay—they just didn't. I doubt if Dr. McKenzie ever filed a suit to collect a fee. He passed away at a ripe old age, beloved by an entire community as their physician, friend, and counsellor, and yet possessed a fair share of this world's goods.

What has happened in these intervening years that now finds the medical profession beset with many new problems which are predominantly economic? Scientific advances of the past two decades have produced miracles in the art of healing. Surely, no one would advocate that we return to the type of medicine practiced at the turn of the century. The method of practice has changed. The assembly line method has increased the efficiency of every physician. He can see more patients, but it is not possible to maintain the close personal relationship that is so important. The people's attitude toward the doctor has changed, and I think I am safe in saying, the doctor's attitude towards the patient has changed. The important thing for us to remember is that the public who respected us almost to the point of elevating us on a pedestal, have removed us from that position and are placing us under rather close scrutiny, even to the point of being highly critical. Aiding and abetting this, we have the social do-gooders and the vote-seeking politician who see in welfare projects the means of self-promotion. Much of this we could offset if we would but take a more active part in allied medical organizations, medical education, public health, public welfare, and so forth.

Here again we, as a group, have fallen down. Health is our commodity and just as we must get out and do our part as citizens, so we must realize that medicine has grown beyond the point that most of us still practice and that is the mere caring for patients and insisting on the alibi that we are too busy for anything else.

The thing we most need is a strong state association; strong in membership, strong financially, and strong cooperatively. It would be well for each district to make the effort of one hundred per cent membership. There are some active young men practicing in the state who are not members of their local districts. There must be a reason, and that we should find out. Financially, the free-wheeling, free-spending philosophy of today has its adherents among members of our association, who believe that as long as we have the money in the till, we should spend it. I believe our state association has important functions that can be accomplished only if we maintain a substantial back-log of funds. I believe our various functions, including our annual meeting should be self-supporting. From a cooperative standpoint, we must first realize the need for unity of action on the local, the state, and the national levels. This can be done only if we are willing to support these various functions by giving of our time, our services, and our financial support.

Criticism becomes a defense mechanism used by some people to avoid financial contributions. Before criticizing the policies of your local or state associations or the American Medical association, remember that the delegates you send through all these organizations formulate the policies and if they are not to your liking, maybe it is because you have taken no action to make it otherwise. The chairman of a committee can accomplish little if the members of that committee fail to turn up.

I hope you have found time to stop at our medical education booth. I also hope that you can see your obligation to support the medical schools of America by making an annual donation. An annual donation of $100 represents an outlay of but $8.33 per month. The tuition fees you paid for your medical education represent but a small portion of the cost of your education. Others, through taxes, paid the balance which roughly amounts to around $4,000 per doctor. This, gentlemen, is the debt, the obligation you owe to your various medical schools that now turn to you in their time of need. Those who have been contributing to their respective schools, please do so through our state office in order that the medical education foundation can receive credit. Large donations through the national fund remain contingent upon the outcome of the success of the medical education foundation. In other words, we are going to receive assistance from outside, depending upon the degree we are willing to help ourselves. All funds designated for a certain school will reach that school in full amount with no deductions for administrative overhead. This, gentlemen, is a responsibility we cannot lightly overlook. If you have not already done so, stop at the booth, and leave your pledge.

I want to thank you one and all for the honor and trust you have bestowed upon me in placing me in this office."

Introduction of New President

O. W. Johnson, M.D., Rugby

It now becomes my duty to pass the responsibility of the office to a man whom I am happy to have become better acquainted with during this past year; a man who has established in his community an excellent clinic and modern medical service. He has served on his school board, has been president of the Lions club, Commercial club and park board. He is past grand patron of the Masonic lodge in his community.

I believe this represents some of the things I think we should hold as our ideals. I know he is a man with whom we can safely deposit the trust of our state association.

INAUGURAL ADDRESS

"The Role of Public Relations, Past, Present and Future, in the Medical Field"

O. W. Johnson, M.D.
Rugby, North Dakota

Mr. President, members of the medical association, and visitors: With each day that passes we realize more and more the great value and vital importance of good public relations to the medical profession. None of us can afford to underestimate the favorable effects of good medical public relations, not only upon each of our own patients, but on the public at large. Good public relations is a priceless asset that we must strive to maintain at all times. We can never afford to let them down. We must not confuse the meaning of publicity with that of public relations, for publicity is only a very small part of the tremendous field of public relations. We might well take note at this time of the definition of public relations given us by Dr. John W. Cline, president of the American Medical association, in an excellent message on the president's page of the March 29 issue, 1952, of the *Journal of the American Medical association.* He stated that public relations is "The opinion that the majority of the public holds concerning some segment of society or the organization representing it." Most of us have probably read this message. If not, I suggest that you all do so.

Let us now consider the status of public relations in the field of medicine as it pertains to the past, as it is today, and what we consider its role should be in the future. What about our public relations in the past? We might well skip most of our checkered past and consider it as "water under the bridge." And yet, there was a most commendable chapter in American medical history which was carved out by the "horse and buggy doctor," the revered country practitioner, the family physician. We are most thankful for those that are still in practice, though they are few and far between. It is difficult to live down the popular concept of this individual with his little black bag, the old practitioner of early days, a man around whom many stories revolve. He was all wise, infinitely versatile, he discussed politics, the new minister, the town improvements, with all comers. He was credited with the management of the most difficult deliveries; he performed miracles of surgery on the kitchen table; he took his pay in chickens, hams, potatoes, cows, cream, milk; anything. He seemingly had no need for cash, and consequently, never met any objections as far as fees were concerned. Just when he ate, bathed, slept, studied new developments in medicine is not made clear.

Then, we have the counterpart of this man; the man in white; efficient; antiseptic to the roots of his hair; delving deep into the research of medicine, master diagnostician; compounder of miracle drugs; medical engineer in the command of cyclotrons and bronchoscopes; surgeon extraordinary; and psychiatrist supreme. He puts off death in wholesale fashion; straightens crooked limbs; and runs a marriage counsel service; this paragon of modern atomic age medicine provides the second mirror against which we popularly are measured. You and I know that each of these figures is a practical impossibility; although each contains elements of truth. It therefore becomes pertinent to draw from each the elements he recognizes as true and desirable and adapt them to the present real situation.

About 1947 or 1948, our public relations at all levels were certainly far from noteworthy. Until after World War II we did little as individuals or as medical organizations to improve our positions in the eyes of the public. As Dr. Cline has so aptly stated, we had "slipped in public veneration from the days of the almost universally adored country doctor." We tried to conform strictly to a policy of no publicity, no information to the press, radio or public; no names in paper; no pictures; and a cold shoulder to all who tried to obtain any type of information about scientific research, medical meetings, accidents, new types of operative procedure, or even the best treatment for the epizodics. We remained behind that so-called "iron curtain of silence" except for the bad publicity that we drew as a result of our own occasional automobile accident, divorce, or malpractice suit. In fact, the word "doctor" to many people meant chiropractor, clergyman, dentist, osteopath, veterinarian, physicist, or druggist on the corner. The word "physician" was seldom used, and we made little or no attempt to help our public relations in the field of medicine. Even in our own office, many of us did not help matters. And so our questionable and rather negative past public relations was, no doubt, greatly responsible for Ewings Health Conference in May 1948. This caused us to wake up and become aroused. It threw a fight into the laps of all physicians whether we wanted one or not. Naturally, the shortage of physicians on the home front during World War II, and the readjustment period thereafter, did not help our public relations cause.

Since about 1948 there have been changes, additions and invaluable improvements in medical organizations and in our public relations. Let us consider some of them at this time. In the past few years many state medical societies have added full time executive secretaries, whereas other organizations now have full time public relations directors. Some have even added one or more field secretaries, who spend much time outside of the state association offices. Most local, county and state medical societies and official medical groups have spokesmen who are authorized to answer questions for the press and radio. I do not believe North Dakota has this. Our national organizations have this same policy. Many of these same organizations issue regular bulletins, or health columns to the press and radio. Health education is being taught to children by means of interesting radio programs, such as the Doctor Tim, detective weekly series of a popular mystery drama in the state of Colorado. Then there are radio talks for adults; health stories in farm magazines and other periodicals; news releases in regard to blood banks, water supply, sewage disposal, dental prophylaxis, accident prevention, vaccination programs and many other health matters of public interest. Moreover, we have emerged from our old rut and now attempt to give the public valuable information about such important matters as voluntary health insurance, civil defense, new scientific developments in medicine, as well as new types of operations. Even names of clinics and physicians have sometimes been specified. Many articles are being written by physicians for public reading about such diseases as rheumatic fever, cancer, and polio. The medical profession is going all out to be honest in its public relations. Although personal publicity is frowned upon, it is considered proper for medical organizations to publicize and accept credit for such medical or public relations advancement that they have initiated or developed.

What about the future of medical public relations in the United States and especially as it pertains to us right here in North Dakota? First of all, our suburban and rural population is vitally interested in the big problem of satisfactory medical care. Here is a tremendous field where we can well afford to exhibit a good public relations policy for we must go all out to do everything possible for our friends on the farms and in the smaller communities. Most people want to know more about such matters as medical expenses, including consultant fees; the cost of operating our hospitals; cost of operation, anesthesia, special nursing care, drugs, x-rays, laboratory fees, etc. We should not feel humiliated or aggravated by the patient who comes in and asks, "Doc, how much is this going to cost?" Can it be fixed or cured? And how long will it take to get over this? These are all individual questions which might be asked by the average individual and to which he is entitled to an answer. We should enlighten them fully on the cost of our over-all medical care, for such has increased greatly in recent years. Failure to accomplish this, lies in the category of poor public relations. We must all enter into various types of community service, give aid whenever such is possible and ethical. We can help in various health and sanitation projects. We should support good voluntary health insurance, and I stress the word "good." It is merely good citizenship to get out and vote; to help when possible in community drives and campaigns, for we are all private citizens and as such have our community obligations. In one state in 1950, it was found that between 35 per cent and 40 per cent of the physicians were not even registered to vote.

Our association should broaden its activities with such groups as the parent-teacher association, school and education groups, the Grange, the state Farm Bureau, United States Chamber of Commerce, dental and veterinary societies, bar associations, pharmaceutical associations, nurses associations, and hospital associations, and others. We should furnish speakers whenever they are in demand or needed for any ethical or worthy enterprise. In the larger communities many medical societies now maintain twenty-four hour emergency telephone answering systems throughout the country; local health councils have been organized. Through sponsorship of the American Medical association plaques are now prominently displayed in the offices of many physicians. These plaques read, "To my patients—I invite you to discuss frankly with me any questions regarding my services or my fees." This certainly helps to promote good public relations. We should also develop more interest and take a more active part in all medical activities and organizations, including hospital staff meetings, scientific meetings at every level, national, state and local.

We must also realize that few of us ever hear about the majority of the complaints that our patients pass on to their neighbors and friends about us. Of course, some of these complaints are not fully justified. Nevertheless, such criticism and complaint usually mushroom over a large portion of a local population. It is like an epidemic that spreads and spreads, although it had its origin in one patient. What do our patients complain about? Here is a tabulation of some of their criticisms:

Excessive medical fees.
Doctor too busy to give proper medical care.
Physician too impersonal or too brusque in manner.
Family doctor did not explain consultant fees.
"My doctor says there's nothing wrong with me; he's crazy."
More anxious to usher them out of the office than into the office.
Too anxious to get on the line with a needle practice.
Poor care and poor food in the hospital.
Poor nursing service in the hospital.
Patient repeatedly sits around the physician's office several hours in order to be treated.
Failure to show interest in them as a whole patient, and as a sick one in need of considerate, total attention.
"My doctor doesn't tell me enough about my condition, so it worries me. If it is bad, I want to know the truth."
"Doctor comes into the room smoking; makes me sicker."
"I can hear everything the doctor says to other patients in his office." In other words, lack of privacy.
High cost of special nursing.

These are just some of the complaints that produce dissatisfied patients and dissatisfied or critical patients surely aid the cause of socialized medicine. The physician himself is our very best medium in furthering good public relations. Good public relations must be placed in our reception room. This is really a place where something can be done and with negligible effort. We must not forget that the secretary is the doctor's ambassador of good will. In the mind of the patient, the attitude, actions, and personality of the secretary are interpreted as the direct projection of the attitude, actions, and personality of the doctor. Do not think that the patient is going to excuse you as a physician, if you have a secretary who is a "sour-puss." Old Doc was warm and friendly. We must recreate the atmosphere of confidence and warm interest he generated, even though it may take real study to develop such technique. The second general charge often is that physicians retreat into their offices and out of their communities. Our lives are not bounded by medicine. Neither are our responsibilities bounded by medicine. The demands of a heavy practice in a time when we are slowly emerging from an ovar-all doctor shortage, particularly of general practitioners, make it easy and natural for most of us to really believe that we must scarcely have time for our own families; much less for community activities outside of our own charity and clinic work. This applies to every physician in North Dakota, as well as to each physician in these United States. This applies to us in our offices, in our hospitals, and in our private homes. Wherever we may go, our actions are always under scrutiny. The physician shoudl be trusted and admired by all those with whom he comes in contact.

I am sure you will agree that it is unnecessary to enumerate in detail the various ways of eliminating our shortcomings, or reducing them to a minimum. The very nature of the above listed criticism indicates the necessary corrective measures. In some instances it merely requires an explanation to the public. We should bear in mind that molehills often assume mountainous proportions in many minds; especially those of the poor, the chronically ill, and those who are greatly worried or are neurotics. We are more and more aware that the proper use of psychosomatic medicine is important; not only therpeutically, but in fostering a better attitude towards the medical profession in the minds and hearts of our patients. It is "tops" in good medical public relationship; for we are all anxious, I am sure, to develop and maintain good physician-patient relationship.

We must also maintain a pleasant and understanding relationship between fellow physicians. Antagonisms between physicians lead to discord and end up by hurting our public relations program. Differences of opinion are normal and healthy, but not discord and bitter antagonism.

We have touched upon the high spots in the role of medical public relations of the past, present and future. Time does not permit a prolonged, detailed presentation of this at this time. I shall never forget the pertinent admonition of one clergyman whose wise remark you possibly have heard. He aptly told his fellow parishioners that, "Few souls are ever saved after the first fifteen minutes of a sermon."

However, in closing I would remind you and myself as well, that each of us is his or her own best ambassador of goodwill in the field of medicine. Moreover, we must also realize that good intentions and resolutions are of no value in any field or profession, unless backed by active, vigorous and continuous action. Actions certainly speak louder than words. Let us all get behind the wheel and do our utmost to help improve our medical public relations throughout these great United States; with especial attention where we can actively do the most good, right here at home in North Dakota.

North Dakota State Medical Association Roster-1952

MEMBERSHIP BY DISTRICTS

Devils Lake

Corbett, C. A.	Devils Lake
Engesather, J. A. D.	Lakota
Fawcett, D. W.	Devils Lake
Fawcett, J. C.	Devils Lake
Fawcett, R. M.	Devils Lake
Fox, W. R.	Rugby
Gray, Archie G.	Carrington
Johnson, C. G.	Rugby
Keller, E. T.	Rugby
Lazareck, I. L.	Devils Lake
MacDonald, J. A.	Cando
Mahoney, J. H.	Devils Lake
Miles, A. M.	Rolla
Owens, C. G.	New Rockford
Palmer, D. W.	Cando
Pine, L. F.	Devils Lake
Pollard, W. S.	Maddock
Seibel, Glenn W.	New Rockford
Sihler, W. F.	Devils Lake
Stickelberger, Josephine S.	Oberon
Terlecki, J.	Minnewaukan
Toomey, G. W.	Devils Lake
Vigeland, G. N.	Rugby

First

Amidon, Blaine F.	Fargo
Armstrong, W. B.	Fargo
Bacheller, S. C.	Enderlin
Bakke, Hans	Lisbon
Bateman, C. V.	Wahpeton
Beithon, E. J.	Wahpeton
Beltz, Melvin E.	Wahpeton
Borland, V. G.	Fargo
Burt, A. C.	Fargo
Christoferson, Lee	Fargo
Clark, I. D., Jr.	Casselton
Corbus, B. C.	Fargo
Cullum, Albert G. J.	Fargo
Darner, C. B.	Fargo
Darrow, K. E.	Fargo
DeCesare, F. A.	Fargo
Dillard, J. R.	Fargo
Dodds, G. A.	Fargo
Donat, T. L.	Fargo
Elofson, C. E.	Fargo
Fortin, H. J.	Fargo
Fortney, A. C.	Fargo
Foster, George C.	Fargo
Gillam, John S.	Fargo
Gronvold, F. O.	Fargo
Hall, G. H.	Fargo
Hanna, J. F.	Fargo
Haugrud, E. M.	Fargo
Hawn, H. W.	Fargo
Heilman, C. O.	Fargo
Hunter, C. M.	Fargo
Hunter, G. W.	Fargo
Huntley, H. B.	Kindred
Irvine, V. S.	Lidgerwood
Ivers, G. U.	Fargo
Klein, A. L.	Fargo
Kroack, Kalman J.	Wahpeton
Kulland, Roy	West Fargo
Lancaster, W. E. G.	Fargo
Larson, G. A.	Fargo
LeMar, John	Fargo
Lewis, A. K.	Lisbon
Lewis, T. H.	Fargo
Long, W. H.	Fargo
Lytle, F. T.	Fargo
Macauley, W. L.	Fargo
Mazur, B. A.	Fargo
Melton, Frank M.	Fargo
Miller, H. H.	Wahpeton
Nichols, A. A.	Fargo
Nichols, W. C.	Fargo
Nuessle, Wm. F.	Fargo
Oftedal, Trygve	Fargo
Poindexter, M. H.	Fargo
Pray, L. G.	Fargo
Rogers, Robert G.	Fargo
Schleinitz, F. B.	Hankinson
Schneider, J. F.	Fargo
Sedlak, O. A.	Fargo
Spier, Jack J.	Fargo
Stafne, W. A.	Fargo
Swanson, J. C.	Fargo
Tainter, Rolfe	Fargo
Thompson, A. M.	Wahpeton
Urenn, B. M.	Fargo
Veitch, Abner	Lisbon
Wasemiller, E. R.	Wahpeton
Webster, William O.	Fargo
Weible, R. D.	Fargo
Wold, Lester E.	Fargo

Kotana

AbPlanalp, Ira S.	Williston
Craven, J. D.	Williston
Craven, J. P.	Williston
Hagan, E. J.	Williston
Johnson, A. K.	Williston
Johnson, P. O. C.	Watford City
Korwin, J. J.	Williston
Lund, C. M.	Williston
McPhail, C. O.	Crosby
Pile, Duane F.	Crosby
Skjei, D. E.	Williston
Wright, W. A.	Williston

Northwest

Ayash, John J.	Minot
Amstutz, K. N.	Minot
Beck, Charles	Harvey
Blatherwick, Robert	Parshall
Boyum, Lowell E.	Harvey
Boyum, P. A.	Harvey
Breslich, Paul J.	Minot
Cameron, A. L.	Minot
Chastain, Richard L.	Minot
Conroy, M. P.	Minot
Craise, O. S.	Towner
Devine, J. L., Jr.	Minot
Devine, J. L., Sr.	Minot
Ensign, William G.	Minot
Erenfeld, F. R.	Minot
Fischer, V. J.	Minot
Flath, M. G.	Stanley
Gammell, R. T.	Kenmare
Garrison, M. W.	Minot
Girard, Bernard A.	Mohall
Goodman, Robert	Powers Lake
Greene, E. E.	Westhope
Halliday, D. J.	Kenmare
Halverson, C. H.	Minot
Hammargren, A. F.	Harvey
Hart, George M.	Minot
Hochhauser, Martin	Garrison
Hordinsky, B. Z.	Drake
Hulit, Robert E.	Minot
Huntley, Wellington B.	Minot
Hurly, Wm. C.	Minot
Johnson, O. W.	Rugby
Johnson, Robert O.	Bottineau
Kermott, Henry L.	Minot
Kermott, Louis H.	Minot
Knudson, K. O.	Glenburn
Lampert, M. T.	Minot
Livingston, N. B., Jr.	Mohall
Malvey, Kenneth	Bottineau
McCannel, A. D.	Minot
Naegeli, F. D.	Minot
Nelson, L. F.	Bottineau
Rowe, P. H.	Minot
Seiffert, G. S.	Minot
Sorenson, A. R.	Minot
Sorenson, Rodger	Minot
Spomer, John P.	Minot
Timm, J. F.	Portland, Oregon
Uthus, O. S.	Minot
Wall, W. W.	Minot
Wheelon, F. E.	Minot
Woodhull, R. B.	Minot

Grand Forks

Alger, L. J.	Grand Forks
Benson, T. Q.	Grand Forks
Benwell, H. D.	Grand Forks
Berger, Philip R.	Grand Forks
Countryman, G. L.	Grafton
Countryman, J. E.	Arch Cape, Ore.
Culmer, A. E., Jr.	Grand Forks
Dailey, Walter C.	Grand Forks
Deason, F. W.	Grafton
Flaten, A. N.	Edinburg
Fritzell, K. E.	Grand Forks
Glaspel, C. J.	Grafton
Goehl, R. O.	Grand Forks
Graham, C. M.	Grand Forks
Graham, John	Grand Forks
Grinnell, E. L.	Grand Forks
Hardy, N. A.	Minto
Haugen, C. O.	Larimore
Haunz, Edgar A.	Grand Forks
Hill, Frank A.	Grand Forks
Jensen, A. F.	Grand Forks
Johann, O. P.	Grafton
Kohlmeyer, A. C.	Larimore
Lamont, J. G.	Grafton
Landry, L. H.	Walhalla
Leigh, Richard	Grand Forks
Leigh, R. E.	Grand Forks
Liebeler, W. A.	Grand Forks
Lommen, C. E.	Fordville
Mahowald, R. E.	Grand Forks
Moore, J. H.	Grand Forks
Muus, J. Meyer	McVille
Muus, O. H.	Grand Forks
Nelson, Wallace W.	Grand Forks
Osten, Taylor A.	Michigan
Painter, Robert C.	Grand Forks
Panek, A. F.	Milton
Peake, F. Margaret	Grand Forks
Piltingsrud, H. R.	Park River
Porter, Charles B.	Grand Forks
Quale, V. S.	Grand Forks
Rand, C. C.	Grafton
Revere, Jack W.	Grand Forks
Ruud, H. O.	Grand Forks
Ruud, John E.	Grand Forks
Ruud, M. B.	Grand Forks
Sandmeyer, John A.	Grand Forks
Silverman, Louis B.	Grand Forks
Stratte, J. J.	Grand Forks

Strom, Adrian D.	Langdon
Thorgrimson, G. G.	Grand Forks
Tompkins, C. R.	Grafton
Tompkins, Wm.	Grafton
Turner, R. C.	Grand Forks
Vance, R. W.	Grand Forks
Waldren, G. R.	Cavalier
Waldren, H. M.	Drayton
Weed, F. E.	Park River
Witherstine, W. H.	Grand Forks
Woutat, P. H.	Grand Forks
Youngs, N. A.	Grand Forks

Sheyenne Valley

Almklov, L.	Cooperstown
Christianson, Gunder	Valley City
Gilsdorf, W. H.	Valley City
Macdonald, A. C.	Valley City
Macdonald, Neil A.	Valley City
Meredith, C. J.	Valley City
Merrett, J. P.	Valley City
Van Houten, J.	Valley City
Wicks, F. L.	Valley City

Sixth

Arneson, C. A.	Bismarck
Bahamonde, Jose M.	Elgin
Baumgartner, C. J.	Bismarck
Benson, O. T.	Glen Ullin
Berg, H. M.	Bismarck
Bertheau, H. J.	Linton
Blumenthal, Philip	Mandan
Bodenstab, W. H.	Bismarck
Boerth, E. H.	Bismarck
Boyle, John T.	Garrison
Breslin, R. H.	Mandan
Brink, N. O.	Bismarck
Buckingham, T. W.	Bismarck
Cartwright, John	Bismarck
Cochran, R. B.	Bismarck
Dahlen, G. A.	Bismarck
DeMoully, O. M.	Flasher
Diven, W. L.	Bismarck
Enders, W. R.	Hazen
Fredricks, L. H.	Bismarck
Freise, P. W.	Bismarck
Gaebe, O. C.	New Salem
Goughnour, Myron	Bismarck
Griebenow, F. F.	Bismarck
Heffron, M. M.	Bismarck
Henderson, R. W.	Bismarck
Hetzler, A. E.	Mandan
Icenogle, G. D.	Bismarck
Jacobson, M. S.	Elgin
Johnson, Kenneth J.	Bismarck
Johnson, Marlin J. E.	Bismarck
Johnson, Paul L.	Bismarck
Kalnins, Arnold	Washburn
Kling, Robert R.	Bismarck
LaRose, V. J.	Bismarck
Larson, L. W.	Bismarck
Levi, W. E.	Beulah
Lindsay, D. T.	Bismarck-Fargo
Lipp, G. R.	Bismarck
Martynski, Val. K.	Glen Ullin
Nuessle, R. F.	Bismarck
Nugent, M. E.	Bismarck
Orr, A. C.	Bismarck
Oster, Ellis	Mandan
Owens, P. L.	Bismarck
Perrin, E. D.	Bismarck
Peters, Clifford	Bismarck
Pierce, W. B.	Bismarck
Quain, E. P.	Salem, Oregon
Radl, R. B.	Bismarck
Roan, M. W.	Bismarck
Salomone, E.	Elgin
Saxvik, R. O.	Bismarck
Schoregge, C. W.	Bismarck
Schoregge, R. D.	Bismarck
Shannon, Dewitt D.	Riverdale
Smith, C. C.	Mandan
Spielman, George	Mandan
Strobel, Robert J.	Bismarck
Thompson, Arnold	Bismarck
Tudor, Robert B.	Bismarck
Vinje, E. G.	Hazen
Vinje, Ralph	Minneapolis
Vonnegut, F. F.	Linton
Waldschmidt, R. H.	Bismarck
Weyrens, P. J.	Hebron
Zukowski, Anthony	Steele

Southwestern

Bush, Clarence A.	Beach
Dukart, C. R.	Dickinson
Dukart, Ralph	Dickinson
Gilsdorf, A. R.	Dickinson
Guloien, H. E.	Dickinson
Gumper, A. J.	Dickinson
Hill, S. W.	Regent
Larsen, Harlan C.	Dickinson
McNeil, J. H.	Hettinger
Maercklein, O. C.	Mott
Martens, Apollon	Killdeer
Reichert, D. J.	Dickinson
Reichert, H. L.	Dickinson
Rodgers, R. W.	Dickinson
Schumacher, Nick W.	Hettinger
Schumacher, Wm. A.	Hettinger
Smith, Oscar M.	Dickinson
Spanjers, Arnold J.	Dickinson
Spear, A. E.	Dickinson
Tosky, Julien	Richardton

Stutsman

Arzt, P. G.	Jamestown
Beall, John A.	Jamestown
Culbert, M. H.	Medina
Elsworth, J. N.	Jamestown
Fergusson, V. D.	Edgeley
Fisher, A. M.	Jamestown
Gerrish, W. A.	Jamestown
Hieb, Edwin O.	Jamestown
Hogan, Clifford W.	Jamestown
Holt, G. H.	Jamestown
Jansonius, J. W.	Jamestown
Larson, E. J.	Jamestown
Lucy, R. E.	Jamestown
Lynde, Roy	Ellendale
McFadden, Robert	Jamestown
Maloney, Basil W.	LaMoure
Martin, Clarence S.	Kensal
Melzer, S. W.	Woodworth
Miles, James V.	Jamestown
Nierling, R. D.	Jamestown
Pederson, T. D.	Jamestown
Sommerness, M. D.	Jamestown
Sorkness, Joseph	Jamestown
VanHouten, R. W.	Oakes
Wolfe, F. E.	Oakes
Wood, W. W.	Jamestown
Woodward, R. S.	Jamestown

Traill-Steele

Cable, Thomas M.	Hillsboro
Cleary, Hugh G.	Northwood
Dekker, O. D.	Hope
Kjelland, A. A.	Hatton
Knutson, O. A.	Buxton
LaFleur, H. A.	Mayville
Little, R. C.	Mayville
Vandergon, K. G.	Portland
Vinje, Syver	Hillsboro
Waydeman, H. B.	Hunter

1952 Membership, North Dakota State Medical Association

AbPlanalp, Ira S.	Williston
Alger, L. J.	Grand Forks
Almklov, L.	Cooperstown
Amidon, Blaine F.	Fargo
Amstutz, Kenneth N.	Minot
Armstrong, W. B.	Fargo
Arneson, Charles A.	Bismarck
Arzt, P. G.	Jamestown
Ayash, John J.	Minot

Bacheller, Stephen C.	Enderlin
Bahamonde, Jose M.	Elgin
Bakke, Hans	Lisbon
Bateman, C. V.	Wahpeton
Baumgartner, Carl J.	Bismarck
Beall, John A.	Jamestown
Beck, Charles J.	Harvey
Beithon, Elmer J.	Wahpeton
Benson, T. Q.	Grand Forks
Benson, O. T.	N. Hollywood, Calif.
Benwell, H. D.	Grand Forks
Berg, H. Milton	Bismarck
Berger, Phil R.	Grand Forks
Bertheau, H. J.	Linton
Blatherwick, Robert	Parshall
Blumenthal, Philip L.	Mandan
Bodenstab, W. H.	Bismarck
Boerth, E. H.	Bismarck
Borland, V. G.	Fargo
Boyle, John T.	Garrison
Boyum, Lowell E.	Harvey
Boyum, P. A.	Harvey
Breslich, Paul J.	Minot
Breslin, R. H.	Mandan
Brink, Norvel O.	Bismarck
Buckingham, T. W.	Bismarck
Burt, Arthur C.	Fargo
Bush, Clarence A.	Beach

Cable, Thomas M.	Hillsboro
Cameron, Angus L.	Minot
Campbell, R. D.	Grand Forks
Cartwright, John	Bismarck
Chastain, Richard L.	Minot
Christianson, Gunder	Valley City
Christoferson, Lee A.	Fargo
Clark, Ira D., Jr.	Casselton
Cleary, Hugh G.	Northwood
Cochran, R. B.	Honolulu, T.H.
Conroy, Martin P.	Minot
Corbett, C. A.	Devils Lake
Corbus, B. C., Jr.	Fargo

Countryman, G. L.	Grafton
Countryman, J. E.	Arch Cape, Ore.
Craise, O. S.	Towner
Craven, J. P.	Williston
Craven, Joe D.	Williston
Culbert, Milo H.	Medina
Cullum, Albert G. J.	Fargo
Culmer, A. E., Jr.	Grand Forks

Dahlen, G. A.	San Francisco, Calif.
Dailey, W. C.	Grand Forks
Darner, Charles B.	Fargo
Darrow, K. E.	Fargo
Deason, Frank W.	Grafton
DeCesare, Francis A.	Fargo
Dekker, Omar D.	Finley
DeMoully, Oliver M.	Flasher
Devine, J. L., Jr.	Minot
Devine, J. L., Sr.	Minot
Dillard, James R.	Fargo
Diven, W. L.	Bismarck
Dodds, G. A.	Fargo
Donat, Theodore L.	Fargo
Dukart, Chris R.	Dickinson
Dukart, Ralph J.	Dickinson

Elofson, Carl E.	Fargo
Elsworth, John N.	Jamestown
Enders, W. R.	Hazen
Engesather, J. A. D.	Lakota
Ensign, Wm. G.	Minot
Erenfeld, F. R.	Minot

Fawcett, Donald W.	Devils Lake
Fawcett, John C.	Devils Lake
Fawcett, Robert M.	Devils Lake
Fergusson, V. D.	Edgeley
Fischer, V. J.	Minot
Fisher, Albert M.	Jamestown
Fjelde, J. H.	Fargo
Flaten, Alfred N.	Edinburg
Flath, M. G.	Stanley
Fortin, H. J.	Fargo
Fortney, A. C.	Fargo
Foster, George C.	Fargo
Fox, W. R.	Rugby
Fredricks, L. H.	Bismarck
Freise, P. W.	Bismarck
Fritzell, Kenneth E.	Grand Forks

Gaebe, O. C.	New Salem
Gammell, R. T.	Kenmare
Garrison, M. W.	Minot
Gerrish, W. A.	Alhambra
Gillam, John S.	Fargo
Gilsdorf, Amos R.	Dickinson
Gilsdorf, W. H.	Valley City
Girard, Bernard A.	Mohall
Glaspel, C. J.	Grafton
Goehl, R. O.	Grand Forks
Goodman, Robert	Powers Lake
Goughnor, Myron	Bismarck
Graham, Charles M.	Grand Forks
Graham, John H.	Grand Forks
Gray, Archie G.	Carrington
Greene, E. E.	Westhope
Griebenow, Frederick F.	Bismarck
Grinnell, E. L.	Grand Forks
Gronvold, F. O.	Fargo
Guloien, Hans E.	Dickinson
Gumper, A. J.	Dickinson

Hagan, Edward J.	Williston
Hall, G. Howard	Fargo
Halliday, D. J.	Kenmare
Halverson, C. H.	Minot
Hammargren, A. F.	Harvey
Hanna, J. F.	Fargo
Hardy, N. A.	Minto
Hart, George M.	Minot
Haugen, C. O.	Larimore
Haugrud, Earl M.	Fargo
Haunz, Edgar A.	Grand Forks
Hawn, H. W.	Fargo
Heffron, M. M.	Bismarck
Heilman, Charles O.	Fargo
Henderson, R. W.	Bismarck
Hetzlre, A. E.	Mandan
Hieb, Edwin O.	Jamestown
Hill, Frank A.	Grand Forks
Hill, S. W.	Regent
Hochhauser, Martin	Garrison
Hogan, C. W.	Jamestown
Holt, George H.	Jamestown
Hordinsky, B. Z.	Drake
Hulit, Robert E.	Minot
Hunter, C. M.	Fargo
Hunter, G. Wilson	Fargo
Huntley, H. B.	Kindred
Huntley, Wellington B.	Minot
Hurley, Wm. C.	Minot

Icenogle, G. D.	Bismarck
Irvine, Vincent S.	Lidgerwood
Ivers, G. U.	Fargo

Jacobson, M. S.	Elgin
Jansonius, John W.	Jamestown
Jensen, August F.	Grand Forks
Johann, O. P.	Grafton
Johnson, A. K.	Williston
Johnson, C. G.	Rugby
Johnson, K. J.	Bismarck
Johnson, Marlin J. E.	Bismarck
Johnson, O. W.	Rugby
Johnson, P. L.	Bismarck
Johnson, P. O. C.	Watford City
Johnson, Robert O.	Bottineau

Kalnins, Arnold	Washburn
Keller, E. T.	Rugby
Kermott, Henry L.	Minot
Kermott, Louis H.	Minot
Kjelland, Andrew A.	Hatton
Klein, A. L.	Fargo
Kling, Robert	Bismarck
Knudson, K. O.	Glenburn
Knutson, O. A.	Buxton
Kohlmeyer, A. C.	Larimore
Korwin, J. J.	Williston
Kroack, Kalman J.	Wahpeton
Kulland, R. E.	West Fargo

LaFleur, H. A.	Mayville
Lamont, J. G.	Grafton
Lampert, M. T.	Minot
Lancaster, W. E. G.	Fargo
Landry, L. H.	Walhalla
LaRose, V. J.	Bismarck
Larsen, Harlan C.	Dickinson
Larson, Ernest J.	Jamestown
Larson, G. A.	Fargo
Larson, L. W.	Bismarck
Lazareck, I. L.	Devils Lake
Leigh, Ralph E.	Grand Forks
Leigh, Richard H.	Grand Forks
LeMar, J. D.	Fargo
Levi, W. E.	Lisbon
Lewis, T. H.	Fargo
Liebeler, W. A.	Grand Forks
Lipp, G. R.	Bismarck
Lindsay, Douglas	Fargo
Little, R. C.	Mayville
Livingston, N. B.	Mohall
Lomen, Clarence E.	Fordville
Long, W. H.	Fargo
Longmire, Lemuel T., Jr.	Grafton
Lucy, R. E.	Jamestown
Lund, C. M.	Williston
Lynde, Roy	Ellendale
Lytle, F. T.	Fargo

McCannel, Archibald D.	Minot
McFadden, Robert L.	Jamestown
McNeil, J. H.	Hettinger
McPhail, C. O.	Crosby
Macaulay, W. L.	Fargo
Macdonald, A. C.	Valley City
MacDonald, J. A.	Cando
Macdonald, Neil A.	Valley City
Maercklein, O. C.	Mott
Mahoney, J. H.	Devils Lake
Mahowald, R. E.	Grand Forks
Maloney, B. W.	LaMoure
Malvey, Kenneth	Bottineau
Martens, Apollon	Killdeer
Martin, Clarence S.	Kensal
Martynski, Val K.	Glen Ullin
Mazur, B. A.	Fargo
Melton, Frank M.	Fargo
Melzer, S. W.	Woodworth
Meredith, C. J.	Valley City
Merrett, J. P.	Valley City
Miles, Alex M.	Rolla
Miles, James V.	Jamestown
Miller, H. H.	Wahpeton
Moore, John H.	Grand Forks
Muus, J. Meyer	McVille
Muus, O. H.	Grand Forks

Naegeli, F. D.	Minot
Nelson, Leslie F.	Bottineau
Nelson, Wallace W.	Grand Forks
Nichols, Arthur A.	Fargo
Nichols, W. C.	Fargo
Nierling, Richard D.	Jamestown
Nuessle, R. F.	Bismarck
Nuessle, William F.	Fargo
Nugent, Milton E.	Bismarck
Oftedal, Trygve	Fargo

Orr, A. C.	Bismarck
Osten, T. A.	Michigan
Oster, Ellis	Fargo
Owens, C. G.	New Rockford
Owens, P. L.	Bismarck

Painter, Robert C.	Grand Forks
Palmer, Dolson W.	Cando
Panek, A. F.	Milton
Peake, F. Margaret	Grand Forks
Pederson, T. E.	Jamestown
Perrin, E. D.	Bismarck
Peters, C. H.	Bismarck
Pierce, W. B.	Bismarck
Pile, Duane F.	Crosby
Piltingsrud, H. R.	Park River

Pine, L. F.	Devils Lake
Poindexter, M. H.	Fargo
Pollard, W. S.	Maddock
Porter, C. B.	Grand Forks
Pray, L. G.	Fargo

Quain, E. P.	Eugene
Quale, V. S.	Grand Forks

Radl, R. B.	Bismarck
Rand, C. C.	Grafton
Reichert, D. J.	Dickinson
Reichert, H. L.	Dickinson
Revere, Jack W.	Grand Forks
Roan, M. W.	Bismarck
Rodgers, Robert W.	Dickinson
Rogers, Robert G.	Fargo
Rowe, P. H.	Minot
Ruud, H. O.	Grand Forks
Ruud, John E.	Grand Forks
Ruud, M. B.	Grand Forks

Salomone, E. J.	Elgin
Sandmeyer, John A.	Grand Forks
Saxvik, R. O.	Bismarck
Schleinitz, F. B.	Hankinson
Schneider, J. F.	Fargo
Schoregge, C. W.	Bismarck
Schoregge, R. D.	Bismarck
Schumacher, Nick W.	Hettinger
Sedlak, O. A.	Fargo
Seibel, Glenn W.	New Rockford
Seiffert, G. S.	Minot
Shannon, Dewitt D.	Riverdale
Sihler, W. F.	Devils Lake
Silverman, Louis B.	Grand Forks
Skjei, D. E.	Williston
Smith, C. C.	Mandan
Smith, O. M.	Dickinson
Sommerness, M. Duane	Jamestown
Sorenson, A. R.	Minot
Sorenson, Rodger	Minot
Sorkness, Joseph	Jamestown
Spanjers, Arnold J.	Dickinson
Spear, A. E.	Dickinson
Spielman, George H.	Mandan
Spier, Jack J.	Fargo
Spomer, John P.	Minot
Stafne, W. A.	Fargo
Stickelberger, Josephine S.	St. Paul, Minn.
Stratte, J. J.	Grand Forks
Strobel, Robert	Bismarck
Strom, Adrian D.	Langdon
Swanson, J. C.	Fargo

Tainter, Rolfe	Fargo
Terlecki, J.	Minnewaukan
Thompson, Andrew M.	Wahpeton
Thompson, Arnold M.	Bismarck
Thorgrimsen, G. G.	Grand Forks
Timm, John F.	Portland, Ore.
Tompkins, C. R.	Grafton
Tompikns, Wm. A.	Grafton
Toomey, G. W.	Devils Lake
Tosky, Julian	Richardton
Tudor, Robert B.	Bismarck
Turner, Robert C.	Grand Forks

Urenn, B. M.	Fargo
Uthus, Oliver S.	Minot

Vance, R. W.	Grand Forks
Vandergon, Keith G.	Portland
Van Houten, R. W.	Oakes
Van Houten, Jacob	Valley City
Veitch, Abner	Lisbon
Vigeland, G. N.	Rugby
Vinje, Edmund G.	Hazen
Vinje, Syver	Hillsboro
Vinje, Ralph	Bismarck
Vonnegut, Felix F.	Linton

Waldren, G. R.	Cavalier
Waldren, H. M.	Drayton
Waldschmidt, R. H.	Bismarck
Wall, Willard W.	Minot
Wasemiller, E. R.	Wahpeton
Waydeman, H. Burrell	Hunter
Webster, William O.	Fargo
Weed, F. E.	Park River
Weible, R. D.	Fargo
Weyrens, Peter J.	Hebron
Wheelon, Frank E.	Minot
Wicks, F. L.	Valley City
Witherstine, W. H.	Grand Forks
Wold, L. E.	Fargo
Wolfe, F. E.	Oakes
Wood, W. W.	Jamestown
Woodhull, Robert B.	Minot
Woodward, R. S.	Jamestown
Wright, Willard A.	Williston
Woutat, Philip H.	Grand Forks

Youngs, Nelson A.	Grand Forks

Zukowski, Anthony	Steele

SIXTH ANNUAL MEETING

WOMAN'S AUXILIARY TO THE NORTH DAKOTA STATE MEDICAL ASSOCIATION

Fargo, North Dakota, May 11, 12, 13, 14, 1952

The sixth annual meeting of the Woman's Auxiliary to the North Dakota State Medical association convened Monday morning, May 12, in the Town hall, Gardner hotel, Fargo.

The meeting was called to order by the state president, Mrs. R. W. Rodgers. The pledge of loyalty was given by Mrs. Gertson, Grand Forks. The address of welcome was given by Mrs. J. C. Swanson, president of the first district and convention chairman, on behalf of the Woman's Auxiliary of the first district. Response was given by Mrs. Rodgers. Mrs. Rodgers then introduced Mrs. Mason G. Lawson, second national vice-president, and only honorary member of the North Dakota woman's auxiliary; Mrs. G. G. Thorgrimson, president-elect, and Mrs. J. W. Kermott, first vice-president.

Those responding to roll call were: Mrs. R. W. Rodgers, president; Mrs. G. G. Thorgrimson, president-elect; Mrs. L. H. Kermott, Jr., first vice-president; Mrs. J. W. Jansonius, recording secretary; Mrs. I. D. Clark, treasurer; Mrs. C. A. Arneson, legislation; Mrs. W. E. G. Lancaster, public relations; Mrs. D. J. Halliday, press and publicity; Mrs. C. J. Meredith, *Today's Health*; Mrs. E. T. Keller, nominating committee; Mrs. R. D. Nierling, finance; Mrs. O. A. Sedlak, first district councillor; Mrs. G. D. Gertson, third district councillor, and Mrs. Joel C. Swanson, district president.

The motion was then made by Mrs. Nierling, seconded by Mrs. Gertson that the minutes of the 1951 state convention be adopted as published in THE JOURNAL-LANCET. Motion carried. The following reports were then given by officers, state chairmen and auxiliary presidents.

Organization Report

All auxiliary districts in North Dakota are fully organized. We have a total membership of 224. A slight drop in membership is due to the fact that a number of doctors have been called into the armed forces and new doctors have not become eligible to the state medical association until they have resided here one year.

Tri-county, with five members, disbanded. Some have left to join their husbands in the armed forces; those remaining could be classified as members at large and join the district of their choice next year.

The state medical society lists in its constitution that all medical doctors in the teaching profession are eligible to become associate members of the state medical association.

The names of doctors who teach full time at the University of North Dakota medical school were sent to Dr. Kohlmeyer, president of the Grand Forks District medical society. The wives of these men will then be eligible to become active members in the medical auxiliary.

MRS. G. G. THORGRIMSON, Chairman

Legislation Report

The national program of the present administration for socialized medicine has been at least temporarily checked. The North Dakota state legislature did not meet in 1951-52. Because of these two facts, the committee on legislation has been relatively inactive. The committee, however, has not assumed an attitude of complacency or indifference, but has been ever alert to the constant threat of socialism with the loss of our princples of Americanism.

This is an election year. With the coming of primary elections, to be followed by both state and national elections, new interest has been aroused in the election of candidates who will continue in their attempts to avert socialism and promote Americanism.

From panel discussions of the National Auxiliary legislation committee it appears that Americanism will be one of the foremost projects of the legislation committee.

The Capital Clinics and Special Bulletins of the American Medical association prepared in their Washington office continue to be the most excellent source of information on national and political and legislative medical topics. Once again it is urged that more personnel of our auxiliary, who are interested, receive these important reports from Washington. It is suggested that bulletins similar to these on a statewide basis, might be most desirable for the 33rd session of our North Dakota state legislature. These could be printed by our state medical office.

The committee on legislation for 1952-53 should be able to look forward to greater activity with interest centered on the election of good national and local candidates, the activities of both the national and state legislative bodies, and a program of Americanism combating both socialism and communism.

MRS. C. A. ARNESON, Chairman

Program Report

We consider that the Woman's Auxiliary to the North Dakota State Medical association had a very successful year under the leadership of Mrs. R. W. Rodgers of Dickinson.

The entire state is organized, although some of the counties do not have active participating members. Due to the small number of doctors in some localities, various counties are grouped together in associations and the auxiliary has used these divisions for their organization. The active members have tried to get as many eligible women as possible to join the auxiliary and this project shall be continued in the hope that as our organization grows and becomes more active, more doctors' wives will be interested in participating and giving us the benefit of both their memberships and abilities.

We do not believe that any component auxiliary in the state of North Dakota is large enough nor holds enough meetings to justify the cost of a printed year-book. However, all district presidents have appointed program chairmen and these chairmen have done excellent work in planning programs that follow the general outline presented by the national auxiliary. Most districts hold only four meeting a year and we feel that under the circumstances they have been able to cover quite a bit of the material sent from national headquarters.

Our student loan fund at the University of North Dakota, which was started last year by Mrs. Keller, is our main project so far. Each auxiliary member is assessed a minimum of $2.00 per year. In addition, there have been card parties, bake sales, teas and style shows, the proceeds of which have been turned over to this fund.

In many of the counties an annual project of the auxiliary is helping with the diabetic clinics, which usually take place in October.

The auxiliary of the Northwest district is helping the patients of San Haven, the tuberculosis sanatorium, sell their handicraft. They have been enormously successful in this project.

No auxiliary is connected with a speakers bureau, but we find that many of them take advantage of the speakers who lecture to the doctors, and in that way they are able to get the finest.

Today's Health was the subject of at least one meeting in the various auxiliaries. We are trying to promote the sale of this excellent magazine published by the A.M.A. and the various *Today's Health* chairmen are doing a very good job.

All auxiliaries cooperated in the civil defense program as much as possible. Where there is an active citizens civil defense committee, the auxiliary was able to accomplish more, as we feel that our role is more one of cooperation than of active leadership in this field.

The auxiliary has continued to stress the fact that we must continue the fight against socialized medicine and the members keep themselves well informed on the progress of this vital subject.

Due to the cooperation of all district program chairmen, we feel that this has been an excellent year for the auxiliary and we are sure that in the future the programs will continue to be a challenge to the women of the auxiliary.

MRS. A. P. NACHTWEY, Chairman

"Today's Health" Report

District 1. Fargo: No subscriptions.

District 2. Devils Lake: 9 one year subscriptions, 3 two year subscriptions, 1 three year subscription. Chairman: Mrs. Robert Fawcett, Devils Lake.

District 3. Grand Forks: 16 one year subscriptions. Chairman: Mrs. T. Q. Benson, Grand Forks.

District 4. Minot: 1 one year subscription. Chairman: Mrs. F. R. Erenfeld, Minot.

District 5. Valley City: 8 one year subscriptions. Chairman: Mrs. Neil A. MacDonald, Valley City.

District 6. Bismarck: 3 one year subscriptions. Chairman: Mrs. P. W. Freise, Bismarck.

District 7. Jamestown: 6 one year subscriptions. Chairman: Mrs. R. L. McFadden, Jamestown.

District 8. Williston: 3 one year subscriptions. Chairman: Mrs. C. M. Lund, Williston.

District 9. Carrington: No report. Chairman: Mrs. R. F. Gilliland, Carrington.

District 10. Dickinson: 12 one year subscriptions, 1 three year subscription. Chairman: Mrs. A. J. Gumper, Dickinson.

Total from state: 58 one year subscriptions; 3 two years subscriptions, 2 three year subscriptions. Grand Total: 63 subscriptions.

Mrs. C. J. Meredith, Chairman

Press and Publicity Chairman Report

Six councillors responded to our call for news in November. In January we heard from four councillors with two reports coming in late. It was decided to issue just one more newsletter in April embodying news of the state convention to be held in Fargo, May 11, 12, 13.

Mrs. D. J. Halliday, Chairman

Bulletin Report

The thirty-seven subscriptions to *The Bulletin* are as follows: Grand Forks, 7; Hillsboro, 1; Elgin, 1; Bismarck, 4; Devils Lake, 1; Maddock, 1; Minot, 9; Regent, 1; Richardton, 1; Rolette, 1; Rugby, 2; Dickinson, 7, and Fargo, 1.

Marjorie Kermott, Chairman

Public Relations Report

District 1. The members of the auxiliary assisted with the blood bank, filter center and Red Cross. They also donated $25 to the Good Samaritan Boys' Ranch at Mapleton.

District 3. The members of the auxiliary have tried to improve the relationship between the doctors' wives and the nurses employed in the community by entertaining them informally in their homes. Two hundred nurses were invited to the auxiliary members' homes for an evening of bridge, movies, or similar entertainment followed by a lunch.

District 4. Our president's letter gave a detailed account of our activities, so I will list briefly the ones that come under the heading of public relations: (1) Public sales of the handwork of San Haven patients. (2) Bake sales to raise money for the medical loan fund. (3) Assistance to Trinity and St. Joseph's hospitals by serving at guild teas and contributing refreshments.

District 5. The members of the auxiliary assisted in mobile x-ray registrations and in the Elks crippled children's program.

District 6. Our big public relations project was our student loan fund. On February 29 of this year our auxiliary held a tea and style show at the Apple Creek country club. The three doctors' wives from Elgin also had a series of bridge parties for the loan fund. They contributed $35, $400 being the total amount turned over to the loan fund from our district.

In the recent floods here, many of our group worked and are still working with the disaster victims at the flood headquarters. At our last meeting, we also donated $50 to the KFYR flood fund.

Districts 2, 7, 8 and 10 have no reports.

Mrs. W. E. G. Lancaster, Secretary

Civil Defense Report

Our woman's auxiliary now has a committee on civil defense. This committee consists of a national chairman, four regional chairmen (North Central, Western, Southern and Eastern), state chairmen, and district chairmen.

In this state six of our ten active districts appointed civil defense chairmen. Since October 22, I have written a number of letters to each district chairman (or president) with regard to this work. Material from our federal civil defense administration in Washington was sent to them, with a suggestion that it be used as program material at one of their meetings.

Upon request, during the past few months reports were sent to our regional chairmen in Chicago, and to our state auxiliary president, as to progress being made in this work.

Each auxiliary district chairman has contacted her county chairman on civil defense, offering the services of her group in case they were needed.

I feel sure that as this committee becomes older and the need becomes more apparent, we will be functioning with more concrete results.

Mrs. R. E. Leigh, Chairman

Sophomore Student Loan Fund Project Receipts

Traill-Steele district	$ 16.00
Southwestern district	24.00
Kotana district	50.00
Northwest district	100.00
Grand Forks district	308.67
Devils Lake district	90.00
Stutsman district	72.00
Fargo district	150.00
Bismarck district	400.00
Sheyenne Valley district	15.00
Total	$1,225.67

It was decided after the above report was read that Mrs. Thorgrimson would present the student loan fund receipts to the University of North Dakota.

President's Report

The Woman's Auxiliary to the North Dakota State Medical association sends greetings to our national president, Mrs. Harold Wahlquist, and to all national officers and members of the Woman's Auxiliary to the American Medical association.

Althoug our auxiliary is but five years old, we can point with pride to many positive achievements. We have ten district auxiliaries with a total membership of 224, and letters were mailed this year to 100 doctors' wives eligible to become members in the hospe of increasing our membership in 1952-53.

At our state board meeting held in Bismarck in October 1951, plans were laid for the year's work and our state program was presented. This conformed as closely as possible to that of the national auxiliary in order to attain the same purposes.

Our historian has sent a complete history of our auxiliary to the national historian as requested.

Bulletin subscriptions compare favorably with the all-over percentage in other states, and of course we are striving for a 100 per cent subscription list.

The North Dakota state legislature did not meet in 1951-52, but with the state and national elections imminent, emphasis has been placed on the election of candidates who will attempt to avert socialism and promote good Americans.

The committee report on public relations shows a concerted effort by auxiliary members to share in the work being done over the state on such programs as the blood bank, mobile x-ray clinics, diabetic and cancer clinics, crippled children's programs and numerous other local and state projects. In some localities where new hospitals are under construction, the auxiliary members are making every effort to assist by raising funds for various necessary articles of furnishing. I think, as state president I can vouch for the fact that where there is a worthy project you will find an auxiliary member working.

Of paramount importance statewide is our Auxiliary project started this last year—the sophomore medical student loan fund. Our fund this year will again be well over the $1,000 mark. We feel that in making this loan to medical students that we are making a major effort in support of medical education.

The nurse recruitment committee reports contacts made with high school students over the state and the importance of nursing careers.

The new civil defense committee set up this year will continue to study needs with local district defense committees and support the project when and where it becomes necessary.

We are able to report a slight increase in our subscriptions to *Today's Health.*"

As president of the North Dakota Auxiliary, I attended the national convention in Atlantic City, New Jersey, and the Chicago Conference of Presidents and Presidents-Elect. It was a privilege to attend these sessions and an inspiration to learn of the far reaching activities of the national auxiliary.

Our annual state convention was held in Fargo May 11-12-13 and we had the pleasure of having Mrs. Mason G. Lawson, second national vice president, as our guest.

To the North Dakota State Medical Association, I extend my sincere thanks for their support and understanding, and to both state and national auxiliary members a wholehearted "thank you" for the cooperation given to me and state officers during the past year. Without this cooperation we could not have completed our year successfully.

Mrs. R. W. Rodgers, President

Mrs. Clark then presented the change in membership according to counties.

District reports were then read.

Auxiliary President's Report—First District

The auxiliary to the First District medical society held four meetings in the past year. There are 50 paid members. This group has helped with the blood bank, Red Cross, cancer drive and filtration program. A gift of $25 was sent to Good Samaritan boys' camp at Mapleton. Transportation and used clothing were given to the needy in order to extend and help the work of the county health department. There was a food sale May 3 to raise money for the student loan fund in which $75 was raised.

The officers were as follows: president, Mrs. Joel Swanson; vice-president, Mrs. Allan E. Moe; secretary, Mrs. Ralph Weible; treasurer, Mrs. L. E. Wold.

Committee for the state convention, May 10-13, was as follows: Mmes. Joel Swanson, chairman; W. E. G. Lancaster, co-chairman; Oliver Sedlak, R. D. Weible, R. G. Rodgers, William Stafne, T. H. Lewis and Charles Heilman.

Mrs. J. C. Swanson, President

Auxiliary President's Report—Second District

The second district of the Woman's Medical Auxiliary has had four regular meetings this year and one as a guest of the Devils Lake group at a concert presented by the Longine Symphonette.

The April meeting concluded the fiscal year with election of officers, a guest speaker on civil defense, and final arrangements for the student loan fund charity ball. This was held May 3rd at the Devils Lake Country club, which gave us a net profit of $90.

The group increased its membership with two new members. We also had one resignation. This to date gives us a membership of twelve.

Today's Health magazine was distributed throughout the district to schools, libraries, and dentists, either by individual purchases or contributions. Each member of the auxiliary purchased the *Bulletin*.

Due to the fact that our membership is so scattered throughout the district, we have been unable to proceed with suggested program projects or socially. However, we hope to have a more active report next spring.

Mrs. J. C. Fawcett, President

Auxiliary President's Report—Third District

The woman's auxiliary to the Grand Forks District medical society has 48 paid-up members.

We have held three dinner meetings, and one luncheon meeting, at which we have had an average attendance of 30 members. Our second meeting of the year was a joint dinner with the members of the Grand Forks District medical society.

Miss Lucile Paulson, supervisor of the nursing school at the Deaconess hospital, and president of the Red River Valley Nurses association, spoke to us at our first meeting. We also had a member of the cancer drive speak to us briefly and distribute pertinent literature.

The Grand Forks auxiliary contributed $50 to the district medical society to aid them in the annual diabets detection drive.

Many of the auxiliary members are cooperative and active in health projects sponsored by other organizations, namely: Red Cross, cancer drive, St. Michael's hospital auxiliary, civil defense, and the Shrine hospital for crippled children.

Eighteen subscriptions have been obtained to *Today's Health* and four to the *Bulletin*.

We consider our big project the maintenance of the student loan fund for sophomore medical students. We will have completed our money-making programs for this project in April, and hope to match our contribution of last year which was over $400. This is being done chiefly by rummage sales.

Another matter which has been occupying our minds this year is the desire of the group to improve the relationship between the doctors' wives and the nursing profession in our community. At this writing, plans are proceeding to entertain student nurses, nursing faculty, hospital supervisors and department heads at small parties in the homes of the auxiliary members.

We were honored by a visit from our state president, Mrs. R. W. Rodgers, and all enjoyed having tea with her.

The following officers were elected for the coming year: president, Mrs. Joseph Stratte; vice-president, Mrs. Leon Alger; secretary, Mrs. J. D. Cardy; treasurer, Mrs. E. L. Grinnell; councillor (holdover), Mrs. G. D. Gertson.

Mrs. Philip H. Woutat, President

Auxiliary President's Report—Fourth District

The woman's auxiliary to the Northwest District medical society has had five dinner meetings this year. At one meeting, Dr. Edna Gilbert of the M.S.T.C. faculty presented the need for more attention to and appropriate legislation for the education of the exceptional child. Miss Leila Ewen was guest speaker at our January meeting. She emphasized the responsibility of the community to the child and our duty to the community as individuals in helping to solve problems of juvenile delinquency. A Red Cross representative spoke at the March meeting telling of its needs and of its wide scope of service. There will be election of officers at the April meeting.

Under the capable supervision of Mrs. A. R. Sorenson, several sales were arranged to provide an outlet for San Haven-made goods. This project of helping the patients at San Haven sell their handiwork is one that gives us all a great deal of pleasure and satisfaction.

The auxiliary purchased a youth's wheel chair for the equipment loan pool at the school for crippled children in Jamestown. We served the St. Joseph's Hospital auxiliary and the Trinity Hospital auxiliary at their November meeting. Two bake sales were held as benefits for the student loan fund.

Although our membership of 21 is not large, there has been good cooperation among the members and we feel we have had a good year.

Mrs. A. L. Cameron, President

Auxiliary President's Report—Fifth District

The woman's auxiliary to the Sheyenne Valley medical society has had four afternoon meetings in the homes of members. These meetings have been primarily social because of limited membership. At the last meeting, auxiliary members were hostesses at a tea entertaining graduating nurses of Mercy hospital.

Members have contributed a small sum of money to the hostess at each meeting as a nucleus for a $15.00 donation to the student loan fund.

The group has a membership of 10 with an average attendance of eight.

The organization reports eight subscriptions to *Today's Health* and one to the *Bulletin*.

Mrs. Gunder Christianson, President

Auxiliary President's Report—Sixth District

The Sixth District medical auxiliary has had three meetings so far, and will have a final meeting on April 15. We will have election of officers and appoint our delegates to the state convention at that time.

Our first meeting last fall was devoted to business and an excellent talk by Dr. Russell Saxvik. He spoke of his problems as state health officer, and our medical school at Grand Forks.

Our second meeting was extremely interesting due to the fact that Dr. M. E. Nugent discussed the eye problems of children. Our young mothers in the group were particularly attentive.

The third meeting was a joint dinner meeting with our husbands. Dr. L. W. Larson discussed the A.M.A. as he sees it. He also discussed the political scene and its concern to the medical association.

We have 37 paid-up members in our association.

Mrs. R. Waldschmidt headed a committee that recently put on a benefit tea and style show. All the profits will go to our student loan fund. The amount is well over $350 at the present time.

The fourth meeting was held April 15. We had election of officers, also we elected a delegate, Mrs. H. M. Berg, to the state convention at Fargo. The sixth district auxiliary presented a check of $400 to the student loan fund. Mrs. R. W. Rodgers of Dickinson, our state president, was the guest speaker.

Mrs. L. W. Larson, President

Auxiliary President's Report—Seventh District

The Stutsman County woman's medical auxiliary opened the 1951-52 year with a dinner meeting on October 25, 1951. A Christmas tea was held in December, at which time members contributed canned goods, clothing, and money to amply supply two needy Christmas families. At the dinner meeting in March, our local defense chairmen, Messrs. F. E. Murphy and Forrest Egleston, spoke on the civil defense program in Jamestown and vicinity. A fourth meeting in April will conclude the active year.

The Stutsman County auxiliary totals 19 members, including wives from Jamestown, the state hospital, LaMoure and Edgeley.

This year's project for the student loan fund has been the sale of baked goods among the auxiliary members, each member baking at the request of the others and the money being contributed to the loan fund.

Mrs. R. E. Lucy, President

Auxiliary President's Report—Eighth District

The Kotana medical auxiliary, district 8, reports the following activities for the past year:

Our group has nine members and meets twice a year. Mrs. J. D. Craven was our delegate to the state convention in Bismarck. We have given three subscriptions of *Today's Health* magazine to the library, Mercy hospital, and the Good Samaritan hospital.

Fifty dollars has been sent into the medical student loan fund and also our dues of $31.50 have been forwarded.

The following new officers were elected for a two year period: Mrs. J. J. Korwin, president; Mrs. E. J. Hagan, vice-president; Mrs. A. K. Johnson, secretary-treasurer; Mrs. J. P. Craven, publicity; Mrs. D. E. Skjei, public relations; Mrs. Joan Hagan, program; Mrs. W. A. Wright, councilor; Mrs. J. D. Craven, civil defense; Mrs. C. M. Lund, *Today's Health.*

Mrs. C. M. Lund, President

Auxiliary President's Report—Traill-Steele District

Our membership remains at eight with one loss and one new member. Our meetings are mainly social and always enjoyable.

We contributed $2.00 per member to the scholarship fund. Other than that we have had no particular program of fund raising for the project.

Mrs. T. M. Cable, President

Auxiliary President's Report—Tenth District

The auxiliary to the Southwestern medical district has a membership of thirteen. Attendance has been almost one hundred per cent whenever roads have permittd outlying members to attend.

Twelve members are subscribers to the *Bulletin* and Mrs. Arnold J. Gumper, *Today's Health* chairman, received twelve subscriptions to said publication.

One new member has been added to our list, and the secretary has sent letters to five eligible women in hopes of increasing our membership.

During the annual diabetic drive the members assisted the local doctors at the community building.

A room in the new wing of St. Joseph's hospital was furnished with linens. A check was also sent to Mrs. Keller to aid the student loan fund.

At the December meeting Mrs. R. W. Rodgers, our state president, gave an interesting talk in regard to her trip to the national convention at Atlantic City.

Mrs. C. R. Dukart, President

* * * *

Motion was made by Mrs. Thorgrimson, seconded by Mrs. Berg, that all reports be approved and published. Motion carried.

Mrs. Rodgers then thanked the officers, all committee members, Dr. Lancaster and the medical society, Mrs. Swanson and District 1 for making it such a pleasure and privilege to serve the auxiliary throughout the year.

Mrs. E. T. Keller, chairman of the nominating committee, then submitted the following report:

Nominating Committee Report

President—Mrs. G. G. Thorgrimson, Grand Forks
President-elect—Mrs. J. H. Kermott, Jr., Minot
First Vice-President—Mrs. S. C. Bacheller, Enderlin
Second Vice-President—Mrs. J. H. Mahoney, Devils Lake
Recording Secretary—Mrs. J. W. Jansonius, Jamestown
Treasurer—Mrs. I. D. Clark, Jr., Casselton

Mrs. Rodgers then asked for nominations from the floor for these offices. As there were none, she asked for a motion nominating the slate of officers. It was moved by Mrs. Berg, seconded by Mrs. Nierling, that the secretary be instructed to cast a unanimous ballot for the entire slate of officers. All voted "aye".

Question was then raised by Mrs. Salamone whether we would continue to need the $200 given to us in the past by the state medical society. Many thought we should now function on our own funds. However, the question then arose as to the limited number of North Dakota towns that could successfully hold a convention and the financing of the convention that would deplete the funds of those districts having the convention.

Mrs. Rodgers stated that she thought by staging a great membership drive to get all the potential members in the auxiliary we could operate independently of the state society. However, Mrs. Lawson stated that since, as an auxiliary, we were merely promoting the state society's program, that our dependence on them was very important to us.

Motion was made by Mrs. Jansonius, seconded by Mrs. Gertson, that we accept the $200 for at least another year.

Mrs. Rodgers then introduced Dr. W. E. G. Lancaster, president of the North Dakota State Medical association, who gave an address of welcome. He stressed the part that the auxiliary is playing in public relations, and highly commended the outgoing officers for their successful program.

Mrs. R. D. Nierling presented the following budget for the auxiliary for the fiscal year 1952-53 and moved that the convention adopt the budget.

Income

Balance	$500.00
From state medical association	200.00
	$700.00

Proposed Expenditures

President:	
1. Discretionary fund (visiting districts, entertaining guests, etc.)	$ 50.00
2. Miscellaneous (telegrams, telephone, postage)	25.00
3. Toward expenses to board meeting (railroad fare and hotel)	100.00
4. Toward expenses to national convention (railroad fare and hotel)	225.00
President-elect:	
1. Expenses to board meeting (railroad fare and hotel)	100.00
Standing committees ($5.00 each)	50.00
Convention fund	100.00
Miscellaneous	50.00
Total	$700.00

Mrs. Nierling's motion was seconded by Mrs. C. A. Arneson and upon vote the budget was declared adopted unanimously.

Mrs. I. D. Clark, treasurer, asked that all bills be ready for presentation during the afternoon session.

The convention then adjourned to reconvene at 2:00 p.m.

A luncheon was held in the Town hall, Gardner hotel, Monday, May 12. Mrs. Weible presented a corsage to Mrs. J. C.

Swanson, convention chairman. Mrs. Mason G. Lawson, honored guest and speaker, was then introduced. One of the highlights of her speech was a discussion of the 22 departments of our parent association, the American Medical association. She stressed the importance of our nurse recruitment program and suggested that we start as early as junior high school trying to get them interested.

The convention reconvened at two o'clock p.m., May 12, 1952. The meeting was called to order by Mrs. R. W. Rodgers, president. Mr. Lyle R. Limond, executive secretary, North Dakota State Medical association, was introduced. His speech dealt with human relations and public relations being one and the same thing. He stated his plans for visiting all the newspaper offices of the state, and his plans for organizing a local regional medical press and radio conference to meet with all the doctors.

Mrs. Freming, secretary to Mr. Limond, suggested that we could get a new heading for our news letter that was more eye-catching and for very little cost. Motion was made by Mrs. Keller, seconded by Mrs. Halladay, that we get the new letterhead. Motion carried.

The president, Mrs. Rodgers, then asked for the report of the revisions committee. It was proposed that we insert the clause in Article VI, Section 1 that we elect councillors before convention time. On discussion of Article V, Section 2, it was decided that it should remain as it is in the constitution.

The new business of electing two delegates to the national convention to be held in Chicago June 9 and 13 was then brought before the convention. Mrs. Rodgers then asked for nominations. Mrs. C. H. Peters, Bismarck, made a motion that Mrs. H. M. Berg be elected delegate to the American Medical association convention. Mrs. Swanson seconded the motion and upon vote carried.

Discussion then followed as to the proposed revisions to the constitution to be presented at the annual meeting in Chicago. Mrs. Thorgrimson made a motion, seconded by Mrs. Cartwright, that each delegate read all the proposed revisions carefully and use her own discretion in voting. Motion carried.

Mrs. Clark raised the question as to how the treasurer should obtain the amount allotted to the auxiliary from the state society. Mrs. Rodgers appointed a committee composed of Mrs. Nierling, Mrs. Rodgers, and Mrs. Clark to ask Dr. Larson, state society treasurer, about this.

Motion was then made by Mrs. Berg, seconded by Mrs. Jacobsen, that the meeting adjourn to reconvene Tuesday, May 13, 19:30 a.m., Town hall, Gardner hotel, Fargo.

The woman's auxiliary to the state medical association reconvened at 9:30 a.m. May 13, Town hall, Gardner hotel. Meeting was called to order by Mrs. Rodgers.

Mrs. Arneson and Mrs. Halliday were appointed to audit the books.

Mrs. Rodgers then asked for the report of the resolutions committee.

Resolutions Report

Whereas, the president, Mrs. R. W. Rodgers, has served the woman's auxiliary to the North Dakota State Medical association faithfully and well; and

Whereas, under her leadership a prosperous and fruitful year has been enjoyed, and

Whereas, her efforts have led to wider recognition of the woman's auxiliary to the North Dakota State Medical association, therefore be it

Resolved, that the woman's auxiliary to the North Dakota State Medical association, in convention assembled in Fargo May 13, 1952, extend to Mrs. R. W. Rodgers its heartfelt thanks and sincere appreciation for the great service that she has rendered to that group.

II.

Whereas, the woman's auxiliary to the North Dakota State Medical association has held its sixth annual meeting in Fargo, and

Whereas, the woman's auxiliary to the First District medical society has served as hostess during the meeting, and

Whereas, the woman's auxiliary to the First District medical society has performed its functions so admirably, and

Whereas, the North Dakota State Medical association and the First District medical society has assisted in this convention, and

Whereas, the arrangements for the various meetings and entertainment have contributed very materially to the success of our sixth annual meeting; therefore be it

Resolved, that the woman's auxiliary to the North Dakota State Medical association extend a vote of thanks to the woman's auxiliary to the First District medical society, to the North Dakota State Medical association, and to the First District medical society.

III.

Whereas, at the sixth annual meeting of the board of the woman's auxiliary to the North Dakota State Medical association held in the city of Fargo in May 1952, a suggestion was made that the national council on rural health with Dr. M. S. Jacobson, Elgin, present state chairman of the council on rural health be assisted by the woman's auxiliary to the North Dakota state medical association;

Whereas, Mrs. H. Kermott, Minot, has been appointed state chairman of rural health and

Whereas, a chairman will be appointed in each district of the woman's auxiliary to the North Dakota State Medical association and a district committee will be named to assist her and the state council on rural health;

Whereas, it is the wish of Dr. Willard Wright, member of the national council on rural health, the committee and all people interested, be invited to attend the conference which will be held in Grand Forks in October 1952 and which conference will be in charge of the North Dakota rural health and North Dakota public health service, and be it

Resolved, that all component auxiliaries of the Woman's auxiliary to the North Dakota State Medical association approve and adopt the plans for assistance to the North Dakota state rural health program.

Mrs. L. H. Kermott, Jr., Chairman

Motion was made by Mrs. Kermott, seconded by Mrs. Johnson, that these resolutions be adopted. Motion carried.

Mrs. Kermott then gave an explanation of the new rural health program.

Mrs. Mason G. Lawson stated that the American Medical association had elevated the rural health committee to a council which is promoting better understanding between the rural people and the medical group.

Mrs. Swanson, convention chairman, then gave the number of auxiliary members registered at the convention as 90.

Mrs. Rodgers then asked for the treasurer's report.

Mrs. I. D. Clark presented the following treasurer's report and stated that all bills were in and books were closed:

Treasurer's Report

Balance on hand, May 21, 1951		$ 690.39
Receipts	$1,681.67	
Disbursements	942.73	
	$ 738.94	738.94
		$1,429.33

Mrs. Rodgers thanked her corps of assistants. Mrs. Swanson praised Dr. Lancaster for his assistance in convention plans. The meeting was then turned over to Mrs. Lawson, who congratulated the incoming officers on their new duties and installed them in their offices.

Mrs. R. W. Rodgers turned over the files to Mrs. G. G. Thorgrimson.

The meeting was then adjourned.

Post-Convention Minutes

Mrs. Thorgrimson called the meeting to order. After learning that Mrs. Berg had declined as an A.M.A. delegate, Mrs. Thorgrimson appointed Mrs. S. C. Bacheller.

Mrs. Lawson stated that the handbooks were being revised and would be available in June. She then told of the new plan of putting $1 in self-addressed envelope for *Bulletin* subscriptions.

Discussion followed about sponsoring an organization composed of medical student's wives at the university and calling the organization Medical Dames. Motion was made by Mrs. Keller, seconded by Mrs. B. C. Corbus, Jr., that we sponsor this organization. Motion carried.

Dr. O. W. Johnson, new state society president, was introduced and spoke on the auxiliary constitution and by-laws.

Mrs. Thorgrimson appointed the following state committee chairmen:

Program: Mrs. S. C. Bacheller, Enderlin.
Organization: Mrs. L. Kermott, Jr., Minot.
"Today's Health": Mrs. J. H. Mahoney, Devils Lake.
Parliamentarian: Mrs. B. C. Corbus, Jr., Fargo.
Nominating: Mrs. R. W. Rodgers, Dickinson.
Revision: Mrs. E. Salamone, Elgin.
Civil Defense: Mrs. R. E. Leigh, Grand Forks.
Historian: Mrs. D. J. Halliday, Kenmare.
Rural Health: Mrs. L. H. Kermott, Jr., Minot.
Legislation: Mrs. C. A. Arneson, Bismarck.
Public Relations: Mrs. J. C. Swanson, Fargo.
Press and Publicity: Mrs. W. A. Liebeler, Grand Forks.
Nurse Recruiting: Mrs. M. S. Jacobsen, Elgin.

The following were appointed to the "project committee":

Mrs. J. P. Craven, Williston, chairman; Mmes. C. J. Baumgartner, Bismarck; Kenneth E. Fritzell, Grand Forks; B. C. Corbus, Jr., Fargo; J. D. Cardy, Grand Forks.

The meeting was then adjourned.

1952 MEMBERSHIP ROSTER

WOMAN'S AUXILIARY TO THE NORTH DAKOTA STATE MEDICAL ASSOCIATION

(Membership by Districts)

First

Bacheller, Mrs. S. C.	Enderlin
Baillie, Mrs. W. F.	719 Broadway, Fargo
Bateman, Mrs. C. V.	529 4th St. N., Wahpeton
Beithon, Mrs. E. J.	429 5th St. N., Wahpeton
Beltz, Mrs. M. E.	207 6th St. N., Wahpeton
Bond, Mrs. J. H.	921 South 9th St., Fargo
Borland, Mrs. V. G.	1514 S. 9th St., Fargo
Burton, Mrs. John P.	804 S. 8th St., Fargo
Corbus, Mrs. B. C., Jr.	424 14th Ave. S., Fargo
DeCesare, Mrs. F. A.	1401 S. 9th St., Fargo
Dillard, Mrs. J. R.	620 S. 8th St., Fargo
Elofson, Mrs. C. E.	1334 N. 3rd St., Fargo
Fjelde, Mrs. J. H.	1526 S. 8th St., Fargo
Fortney, Mrs. A. C.	1122 S. 9th St., Fargo
Hall, Mrs. Howard	1250 N. 5th St., Fargo
Hanna, Mrs. J. F.	907 12th Ave. S., Fargo
Heilman, Mrs C. O.	1338 N. 2nd St., Fargo
Hunter, Mrs. C. M.	1335 S. 6th St., Fargo
Huntley, Mrs. H. B.	Kindred
Irvine, Mrs. V. S.	Lidgerwood
Kellogg, Mrs. I. W.	Fairmount
Lancaster, Mrs. W. E. G.	1437 S. 8th St., Fargo
Larson, Mrs. G. A.	1538 S. 9th St., Fargo
LeMar, Mrs. John D.	1249 N. 10th St., Fargo
Lewis, Mrs. T. H.	121 N. 5th St., Fargo
Long, Mrs. W. H.	1438 S. 8th St., Fargo
Lytle, Mrs. F. T.	1007 N. 13th St., Fargo
Mazur, Mrs. B. A.	1237 N. 3rd St., Fargo
Moe, Mrs. A. E.	1112 6th Ave. S., Moorhead, Minn.
Miller, Mrs. H. H.	609 4th St. N., Wahpeton
Ostfield, Mrs. J. H.	1120 5th Ave. S., Fargo
Poindexter, Mrs. M. H.	721 S. 4th St, Moorhead, Minn
Pray, Mrs L. G.	1526 S. 7th St., Fargo
Richter, Mrs. E. H.	Hunter
Rodgers, Mrs. R. G.	1217 S. 7th St., Fargo
Sasse, Mrs. Sophia	Lidgerwood
Schneider, Mrs. J. F.	11 N. 11th St., Fargo
Sedlak, Mrs. O. A.	1406 S. 8th St., Fargo
Stafne, Mrs. W. A.	1409 S. 9th St., Fargo
Swanson, Mrs. J. C.	1220 S. 8th St., Fargo
Schleinitz, Mrs. F. B.	Hankinson
Weible, Mrs. R. D.	1630 S. 9th St., Fargo
Weible, Mrs. R. E.	714 S. 8th St., Fargo
Wold, Mrs. L. E.	912 S. 13th, Moorhead, Minn.
Thompson, Mrs. A. M.	313 7th St. N., Wahpeton
Wasemiller, Mrs. E. R.	531 1st St. N., Wahpeton
Wright, Mrs. W. K.	1417 S. 8th St., Fargo

Devils Lake

Engesather, Mrs. J. A. D.	Brocket
Fawcett, Mrs. D. W.	1105 5th St., Devils Lake
Fawcett, Mrs. J. C.	1125 5th St., Devils Lake
Fawcett, Mrs. R. M.	816 9th St., Devils Lake
Fox, Mrs. W. R.	Rugby
Graham, Mrs. J. D.	510 10th Ave., Devils Lake
Gerber, Mrs. L. S.	Lakota
Johnson, Mrs. C. G.	307 W. 3rd St., Rugby
Keller, Mrs. E. T.	Rugby
Mahoney, Mrs. J. H.	915 8th St., Devils Lake
Palmer, Mrs. D. W.	Cando
Pine, Mrs. L. F.	919 3rd St., Devils Lake
Pollard, Mrs. W. S.	Shannon Blk., Devils Lake
Sihler, Mrs. W. F.	412 7th St., Devils Lake
Toomey, Mrs. G. W.	418 7th St., Devils Lake
Vigeland, Mrs. G. N.	Rugby

Grand Forks

Alger, Mrs. L. J.	81 4th Ave. S., Grand Forks
Arneson, Mrs. O. A.	419 S. 5th St., Grand Forks
Benson, Mrs. T. Q.	1101 Reeves Drive, Grand Forks
Benwell, Mrs. H. D.	625 S. 3rd St., Grand Forks
Cardy, Mrs. J. D.	1515 Oak, Grand Forks
Culmer, Mrs. A. E., Jr.	1503 Oak, Grand Forks
Dailey, Mrs. W. C.	1404 Chestnut, Grand Forks
Fritzell, Mrs. K. E.	1125 Reeves, Grand Forks
Gertson, Mrs. G. D.	511 S. 5th, Grand Forks
Goehl, Mrs. R. O.	1015 Reeves, Grand Forks
Graham, Mrs. Charles	822 Belmont Road, Grand Forks
Haunz, Mrs. E. A.	1027 Lincoln Drive, Grand Forks
Hill, Mrs. Frank	Grand Forks
Leigh, Mrs. R. E.	17 Conkling Ave., Grand Forks
Liebeler, Mrs. W. A.	619 Belmont Road, Grand Forks
Lommen, Mrs. C. E.	Fordville
Mahowald, Mrs. R. E.	606 S. 5th St., Grand Forks
Porter, Mrs. Charles	Grand Forks
Quale, Mrs. V. S.	1620 Belmont Road, Grand Forks
Ruud, Mrs. H. O.	504½ Reeves Drive, Grand Forks
Sandmeyer, Mrs. J. A.	1722 University Ave., Grand Forks
Silverman, Mrs. L. B.	606 Reeves Drive, Grand Forks
Stratte, Mrs. J. J.	403 Division Ave., Grand Forks
Thorgrimson, Mrs. G. G.	1215 Lincoln Drive, Grand Forks
Turner, Mrs. Robert	Grand Forks
Witherstine, Mrs. W. H.	214 8th Ave. S., Grand Forks
Woutat, Mrs. P. H.	1205 Lincoln Drive, Grand Forks
Youngs, Mrs. N. A.	511 Reeves Drive, Grand Forks

Kotana

Craven, Mrs. J. D.	915 2nd Ave. W., Williston
Craven, Mrs. J. P.	409 3rd Ave. E., Williston
Hagan, Mrs. E. J., Jr.	410 2nd Ave. E., Williston
Hagan, Mrs. E. J., Sr.	410 2nd Ave. E., Williston
Johnson, Mrs. A. K.	717½ 2nd Ave. E., Williston
Korwin, Mrs. J. J.	701 2nd Ave. E., Williston
Lund, Mrs. C. M.	701 1st Ave. E., Williston
Skjei, Mrs. D. E.	521 6th Ave. W., Williston
Wright, Mrs. W. A.	822 2nd Ave. E., Williston

Northwest

Ball, Mrs. W. J.	405 Thompson Apts., Minot
Beck, Mrs. Charles	Harvey
Bethea, Mrs. R. O., Jr.	121 9th Ave. N.W., Minot
Blatherwick, Mrs. R.	Parshall
Breslich, Mrs. P. J.	818 4th St. S.E., Minot

Cameron, Mrs. A. L.	318 8th Ave. S.E., Minot
Conroy, Mrs. M. P.	301 Thompson Apts., Minot
Craise, Mrs. O. S.	Towner
Devine, Mrs. J. L., Jr.	901 4th St. S.E., Minot
Dyson, Mrs. R. E.	717 4th St. S.E., Minot
Erenfeld, Mrs. H. M.	306 9th St. S.E., Minot
Erenfeld, Mrs. F. R.	616 Lincoln Ave., Minot
Fischer, Mrs. V. J.	707 3rd St. S.E., Minot
Gammell, Mrs. R. T.	Kenmare
Garrison, Mrs. M. M.	612 Mount Curve Ave., Minot
Halliday, Mrs. D. J.	Kenmare
Halverson, Mrs. H. L.	912 2nd St. N.W., Minot
Hurly, Mrs. W. C.	920 3rd Ave. S.E., Minot
Ingalls, Mrs. C. L.	434 5th Ave. N.W., Minot
Johnson, Mrs. H. P.	1124 8th St. N.W., Minot
Kermott, Mrs. Henry	21 7th St. N.W., Minot
Lampert, Mrs. M. T.	101 10th St. N.W., Minot
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O'Neill, Mrs. R. T.	529 3rd St. S.E., Minot
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Ransom, Mrs. E. M.	715 1st Ave. N.W., Minot
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Spomer, Mrs. J. P.	115 7th St. S.E., Minot
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Sorenson, Mrs. Roger	1000 4th Ave. N.W., Minot
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Gilsdorf, Mrs. W. H.	Valley City
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Meredith, Mrs. C. J.	Valley City
Macdonald, Mrs. A. C.	Valley City
Macdonald, Mrs. A. W.	Valley City
Wicks, Mrs. F. L.	Valley City
Brown, Mrs. Nida	Valley City
Crosby, Mrs. Kate	Valley City

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Bahamonde, Mrs. J. B.	Elgin
Berg, Mrs. H. M.	214 Avenue A, Bismarck
Brandes, Mrs. Marion E	601 5th Ave., Bismarck
Boerth, Mrs. E. H.	610 Avenue B, Bismarck
Breslin, Mrs. R. H.	107 1st Ave. N.W., Mandan
Buckingham, Mrs. T. W.	1030 5th Ave., Bismarck
Cartwright, Mrs. John	926 7th St., Bismarck
Cochran, Mrs. R. B.	520 Ave. C West, Bismarck
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DeMoully, Mrs. O. M.	Flasher
Diven, Mrs. W. L.	119 Ave. B West, Bismarck
Fredricks, Mrs. L. H.	112 Ave. B West, Bismarck
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LaRose, Mrs. V. J.	522 Sixth St., Bismarck
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Peters, Mrs. Clifford	220 Ave. A West, Bismarck
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Saxvik, Mrs. R. O.	622 8th St., Bismarck
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News Briefs . . .

North Dakota

The possibility of establishing a chronic disease hospital on the University of North Dakota campus is being checked by the medical center advisory council which met in Grand Forks on June 28. W. W. Murrey of Fargo was elected council president, R. H. Sherman, Bismarck, vice president, and Dean Potter, secretary. Governor Norman Brunsdale has named Dr. W. E. G. Lancaster of Fargo, Dr. V. J. Fischer of Minot and Dr. C. J. Glaspel of Grafton to membership on the board, all to serve three-year terms.

* * *

Twenty-six physicians have been licensed to practice in North Dakota as a result of the July examination of the State Board of Medical Examiners. They include: Hugh R. Davidson, Riverdale; Thomas F. Garland, Velva; Harold Bookbinder, Winnipeg, Manitoba; Mark A. Hayward, Ellendale; John F. Johanson, Kenmare; Johan A. Ericksen, Bismarck; Paul H. Potter, Grand Forks; Marshal Landa, Fargo; Frank G. White, Leeds; William M. Buckingham, Hillsboro; Frederick Blankenstein, Rolla.

James J. Moses, Bismarck; Frank D. Peterkin, Langdon; Samuel E. Shea, Minot; William R. Taylor, Fargo; Robert W. McLean, Hillsboro; Richard S. Larson, Velva; Clifford J. Klein, Valley City; James F. Nelson, Bismarck; Edwin O. Wicks, Valley City; Phillip O. Dahl, Bismarck; Loyala Donely Taylor, Fargo; Robert C. Lewis, Bowman; Zoya Kudinoff, Halliday, and Adolf Curiskis, New England, North Dakota.

At an organization meeting of the board, Dr. F. E. Weeks of Park River was elected president, Dr. R. B. Radl of Bismarck, vice president, and Dr. C. J. Glaspel of Grafton, re-elected secretary.

* * *

An $8,000 grant was made to Dr. William E. Cornatzer of the University of North Dakota medical school as a continuation of a grant received last October for a study of fat metabolism. Dr. Cornatzer is using radio-active isotopes in his study of liver disease.

Minnesota

Dr. Louis A. Buie, professor of surgery in the Mayo Foundation, University of Minnesota, was given the 1952 Alumni Honor Award and Gold Key by the Medical Alumni Association of the University of Maryland "for outstanding contributions to medicine and distinguished service to mankind."

* * *

Dr. Owen H. Wangensteen, head of the department of surgery at the University of Minnesota and a member of The Journal-Lancet board of editors, is serving as director of the fourth annual course in postgraduate gastroenterolgy held by the National Gastroenterological Association at the Hotel Statler, New York, October 23 to 25.

* * *

The Minnesota Heart Association announces the election of Dr. Grace Roth of the Mayo clinic, Rochester, as president. Other officers are Dr. Thomas J. Kinsella, Minneapolis, first vice president; Robert L. Utne, St. Paul, second vice president; Dr. Charles N. Hensel, St. Paul, secretary, and Otto B. Klett, treasurer.

* * *

Dr. John Reitmann, superintendent of the state hospital at Sandstone, has been named head of the Anoka state hospital until appointment of a permanent success to Dr. Edmund Miller, who died July 9, has been made.

South Dakota

Five South Dakota communities were granted emergency medical status for the use of displaced doctors at the annual meeting of the state board of medical examiners in Rapid City July 15. They are Willow Lake, Bowdle, Midland, Philip and Timber Lake. Dr. Faris Pfister, Webster, was re-elected president of the board.

Wisconsin

The University of Wisconsin medical school is providing medical information for an executive leadership program sponsored by the University of Wisconsin Industrial Management Institute.

Notices . . .

North Dakota Society of Obstetrics and Gynecology

The North Dakota Society of Obstetrics and Gynecology will hold its annual fall meeting on Friday and Saturday, September 12 and 13, in Fargo, North Dakota. A stimulating and instructive program has been arranged.

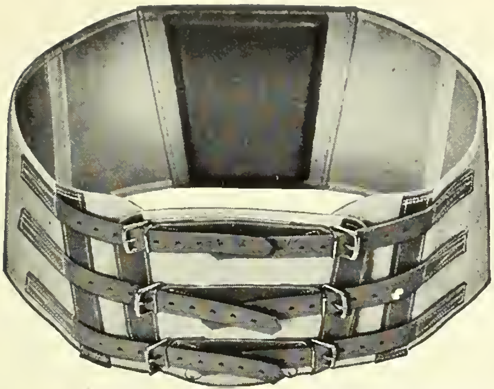
On Friday Dr. George Gardner of Chicago will be the initiating speaker of the Leonard W. Larson lectureship in female cancer, established last year by the North Dakota Cancer society. His topic will be cancer of the ovary. Dr. Roger Scott of St. Louis will follow with "Experimental and Clinical Problems of Endometriosis."

On Saturday, Dr. Rodney Sturley will present his film on cesarean section and discuss the role of the section as a maternal mortality problem. Dr. Robert Woodhull of Minot will give the presidential address, and Dr. John McKelvey will lead a round table discussion on the problems associated with the founding and maintenance of a maternal mortality program. Papers will also be presented by Dr. G. L. Countryman of Grafton, Dr. Frank Hill of Grand Forks, and Dr. G. Wilson Hunter of Fargo.

Extracurricular activities include a banquet on Friday evening and a trap shoot on Saturday afternoon. A cordial invitation to attend is extended to all physicians in the surrounding territory. For registrations, write Dr. John S. Gillam, secretary-treasurer, Box 1388, Fargo, North Dakota.

American College of Physicians Regional Meeting

The sixth annual North Dakota regional meeting of the American College of Physicians will be held on Saturday, September 13, 1952 at Grand Forks, North Dakota. Members of the college and their guests in North Dakota, from other states and the provinces of Canada are welcome. The registration fee of $10.00 includes scientific session, luncheon, dinner and evening activities. Reservations should be made with the local chairman, Dr. R. O. Goehl, Grand Forks, North Dakota.



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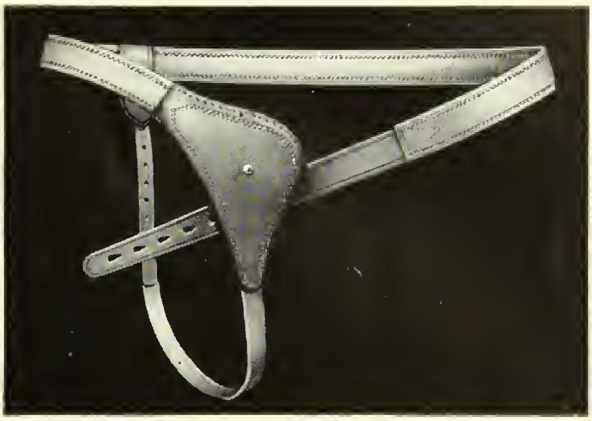

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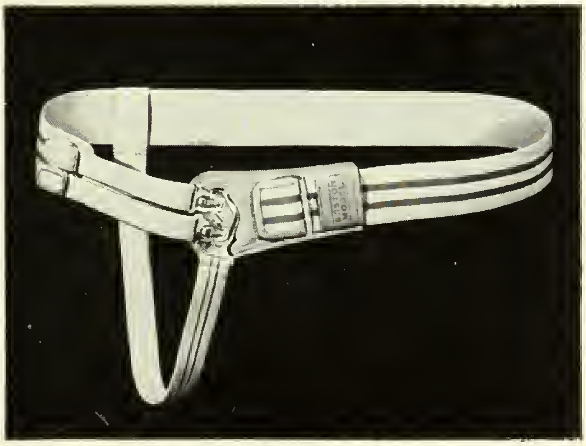

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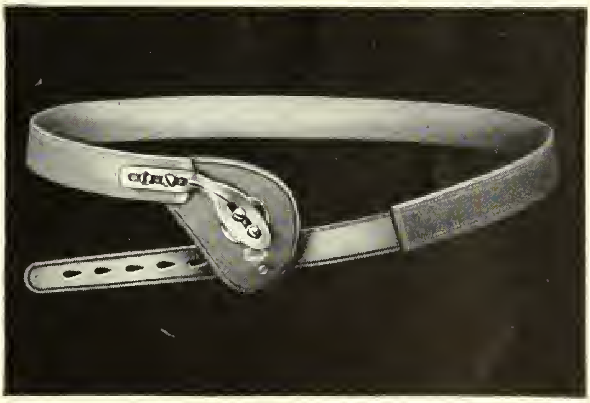

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The sedative employed to allay daytime nervousness and enable more restful sleep should:

1. effectively reduce tension
2. have low toxicity
3. be non-habit-forming
4. be non-soporific

thus permitting the patient to carry out usual daytime activity.

It has been observed that the double salt calcium bromido-galactogluconate meets these criteria particularly well, since the bromine and calcium exert synergistic sedation, and at the same time, the calcium counter-acts bromine toxicity. (See table.)

Calcium bromido-galactogluconate is known as Calcibronat.

PROPERTIES OF SEDATIVES COMPARED

PROPERTY UNDER CONSIDERATION	BARBITURATES	ALKALINE BROMIDES (salts of Na, K & Ammonium)	CALCIBRONAT
Intensity of daytime sedation	Greater than necessary — results in drowsiness	Satisfactory—no drowsiness	**Satisfactory—no drowsiness**
Habit-forming?	Yes	No	**No**
Cumulative toxicity	Relatively high	Tendency to bromism	**Low**
Palatability	Bitter, but can be given in tablet form.	Poor (disagreeable saltiness)	**Good (no disagreeable taste)**
Gastric toleration	Satisfactory	Poor (alkalinity leads to gastric upset).	**Good (no gastric irritation)**

Calcibronat is a mild neuro-sedative, useful in treating cases of "nervousness." Its particular attributes are:

1. It does not cause sluggishness during waking hours.
2. It can be taken orally for prolonged use.
3. Because of its rapid onset of action, it can be used parenterally in unusually disturbed patients.
4. It is non-habit-forming and non-toxic.

Reference: ALPERT, B.: Year Book Of General Therapeutics, Chicago, Year Book Publishers, 1940, p. 371.

For further data on the use of this drug in the control of unpleasant symptoms, nervousness and pruritus associated with dermatologic conditions, write to:

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Scientific Dept., 68 CHARLTON ST., NEW YORK, N.Y.

University of Minnesota Continuation Courses

A course on Treatment of Diseases of the Chest will be presented by the University of Minnesota in conjunction with the American College of Chest Physicians and the Minnesota Chapter of the American Trudeau Society at the Center for Continuation Study on October 16-18, 1952. The course is intended primarily for physicians engaged in private practice. Guest speakers include Dr. Arthur J. Vorwald, director of the Trudeau Foundation and Dr. Paul A. Bunne, Department of Medicine, State University of New York at Syracuse.

A course in Gastrointestinal Roentgenology for Radiologists will be held from October 20 to 25. On Wednesday, October 22, the annual Leo G. Rigler Lecture will be given by Dr. B. J. Kirklin, department of radiology, Mayo Foundation, Rochester. The course, under the direction of Dr. Rigler, will be given by staff members of the University of Minnesota medical school and a visiting faculty.

* * *

Minnesota Public Health Conference

Problems of old age and rehabilitation will be featured at the Minnesota Public Health Conference this year. The conference will meet October 2 and 3 at the St. Paul hotel, St. Paul, and is open to anyone interested in public health. Minnesota physicians who will participate in talks and panels include Dr. E. L. Tuohy, Duluth; Dr. Franklin Top, professor in the School of Public Health, University of Minnesota; Dr. James P. O'Keefe, St. Cloud; Dr. Robert N. Barr and Dr. D. S. Fleming, Minnesota Department of Health; Dr. Russell H. Frost, superintendent of Glen Lake Sanatorium Dr. Walter P. Gardner, St. Paul; Dr. Mary E. Giffin, Dr. V. O. Wilson and Dr. Charles Scheard, Rochester; Dr. S. A. Whitson, Albert Lea; Dr. E. A. Kilbride, Worthington; Dr. E. C. Bayley, Lake City; Dr. H. A. Roust, Montevideo, and Dr. G. S. Boyer, Crookston. Dr. D. R. Gillespie, past president of the St. Paul Health Council, will be toastmaster at the annual banquet on Thursday evening, October 2. The meeting is open to anyone interested in public health.

* * *

Omaha Mid-West Clinical Society

The twentieth anniversary clinical assembly of the Omaha Mid-West Clinical society will be held at Hotel Paxton, Omaha, Nebraska, October 27 to 31, inclusive. The program includes papers by guest and member speakers, clinics, panel discussions, question and answer periods, as well as a daily motion picture schedule and scientific and technical exhibits.

All interested physicians in the region are invited to attend. For further information write the executive office, 1031 Medical Arts Building, Omaha, Nebraska.

* * *

Minnesota Academy of General Practice

The Minnesota Academy of General Practice will hold its annual Fall Refresher at the Hotel Radisson in Minneapolis on Wednesday, the 29th of October, 1952, starting at 8:20 a.m. This is an intensive one-day course on a variety of subjects. A distinguished list of speakers will include Drs. Philip Thorek and Philip Lewin of Chicago, Dr. A. C. Corcoran of Cleveland, Dr. J. E. Estes of the Mayo Clinic, Drs. E. T. Bell and Cecil J. Watson of the University of Minnesota. This assembly has been approved by the Academy for formal postgraduate study and the members will be credited with the actual number of hours of attendance at the sessions.

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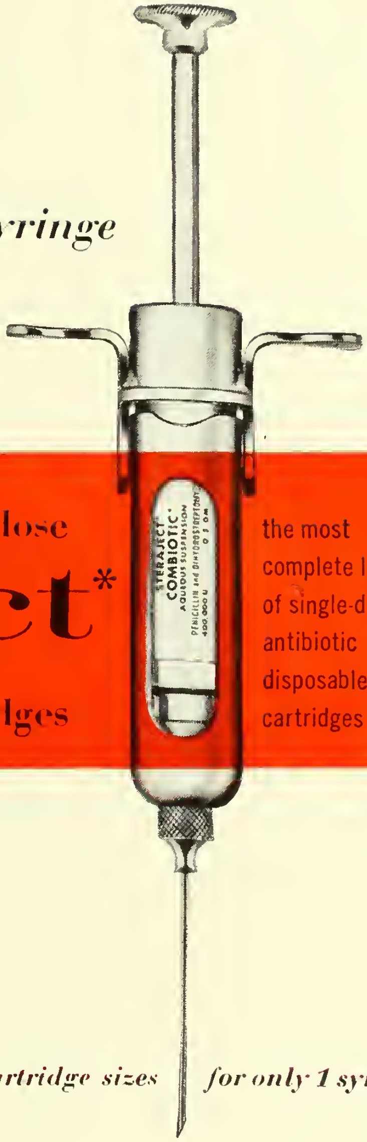

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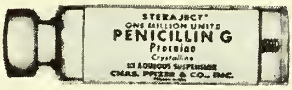

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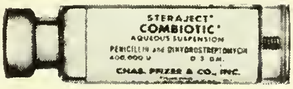

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International Meetings

European Society of Cardiovascular Surgery, Strasbourg, France, Oct. 3-4. Sir James Learmonth, Department of Surgery, University New Buildings, Edinburgh 8, Scotland.

Inter-American Congress of Radiology, Mexico City, Mexico, Nov. 2-8. Dr. Guido Torres Martinez, Marsella No. 11, Mexico, D.F., Secretary-General.

International Congress of Haematology, Mar del Plata, Argentina, Sept. 21-26, Dr. Carlos Reussi, Anchorena 1710, Buenos Aires, Argentina, Secretary.

International Hospital Congress, London, England, May 25-30, 1953. Capt. J. E. Stone, 10 Old Jewry, London, EC2, England, Hon. Secretary.

World Congress of Medicine, Montecatini, Italy, Oct. 16-18. Secretariat: Corso Trieste, 65, Rome, Italy.

World Medical Association, Athens, Greece, Oct. 12-16. Dr. Louis H. Bauer, 2 East 103d St., New York 29, N. Y., Secretary General.

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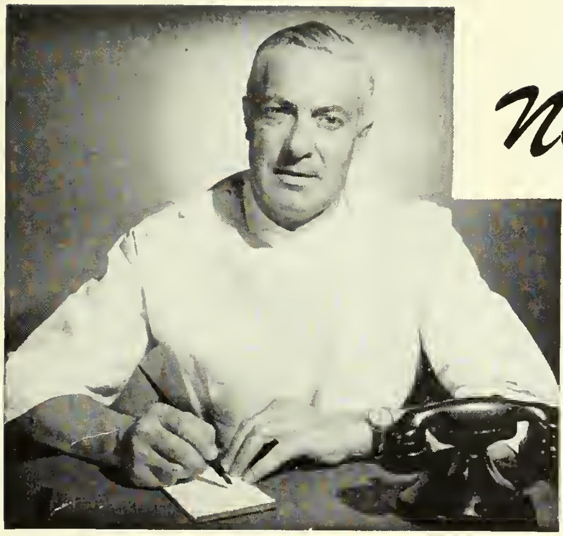

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COLLAGEN DISEASES—(Cont. from page 402)

morphonuclear leukocytes were found which suggested inclusion bodies. Barnes and coworkers have described such inclusion bodies which they interpret as being a stage in the evolution of the L.E. cell. Tests were made of the patients' blood serum for the L.E. phenomenon according to the Barnes-Moffatt technic, using normal leukocytes. L.E. bodies could not be demonstrated.

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(Continued from page 408)

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EDITOR'S NOTE. Due to limitations of space, it was found impossible to include in this issue the eleventh of the series of letters by Dr. Ancel Keys entitled, Notes from a Medical Journey. We assure our readers that the letters will resume publication in the October issue.

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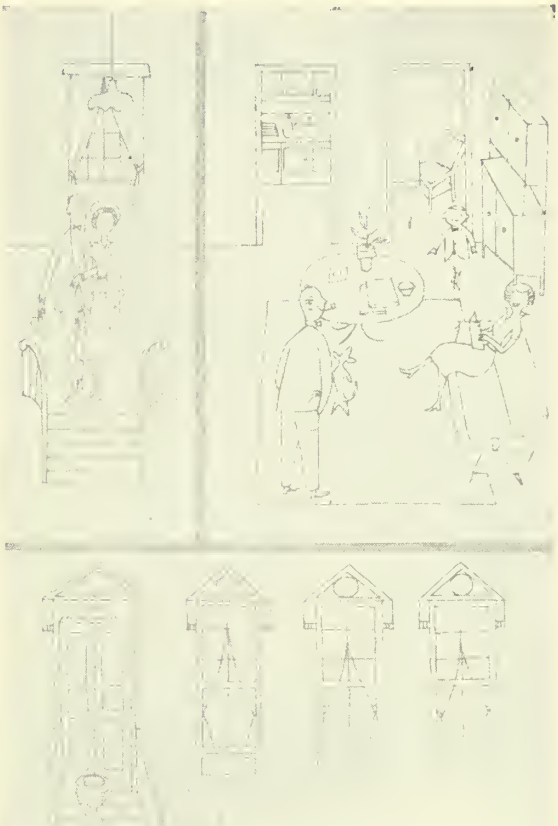
(Continued on page 458)



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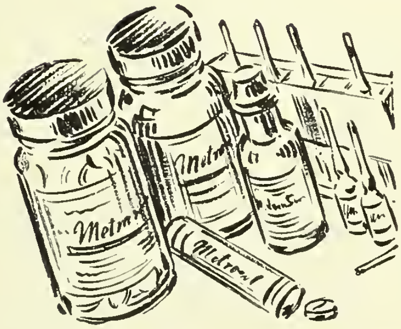

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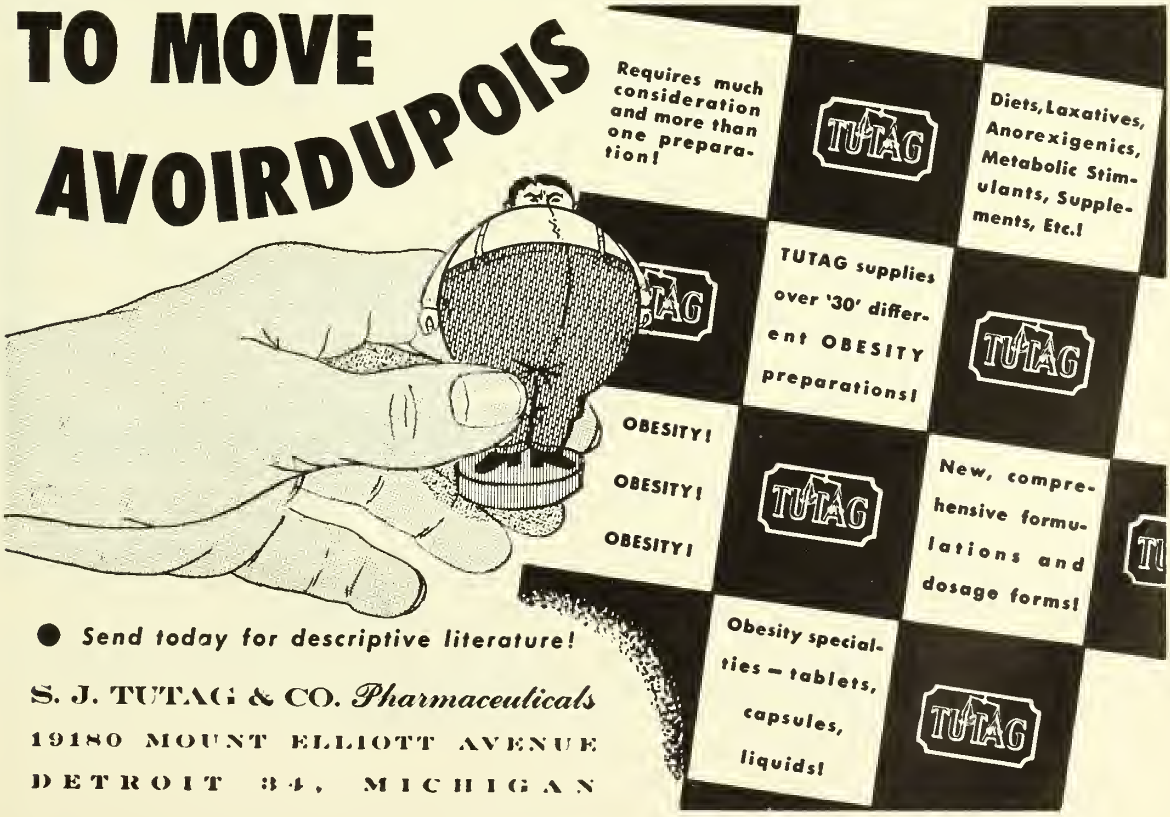
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Successful Management of the Diabetic Patient*

E. A. HAUNZ, M.D.
Grand Forks, North Dakota

DESPITE our modern era of specialization, the diagnosis and treatment of diabetes mellitus is still largely in the realm of the general practitioner. Only a small fraction of the nation's million diabetics currently under treatment are supervised by so-called diabetes specialists. Likewise, only a small fraction of the estimated million diabetics currently undiscovered will be diagnosed by the latter group. The general practitioner, if he is "diabetes conscious," is in a more strategic position than any other individual or group of individuals to find these hidden cases because he is not only in the majority, but sees a continuous cross section of clinical medicine.

Having made the diagnosis which in most cases is relatively simple, the physician must decide upon the school of therapy which he chooses to follow in managing his patient. Basically, there are three such "schools," the proponents of which have been categorically dubbed "Purists," "Middle of the Roaders," and "Free Dieters" by Mosenthal.[1] Principles of therapy advocated by these respective schools are listed in table I.

TABLE I
Basic Principles of the Three Sects of Clinicians Advocating Fixed Procedures for Diabetes Therapy*

"Purists"	"Middle of the Roaders"	"Free Dieters"
1. No sugar, diet carefully calculated and measured (or weighed) with adequate maintenance 2. Normal blood sugar constantly maintained 3. Glycosuria completely checked 4. This may be regarded as a temporary measure or a permanent plan	1. No sugar, diet with about 150 g. of carbohydrate, adequate protein, and average fat 2. Normal blood sugar levels insofar as possible, at least at intervals during the day 3. Most specimens sugar free, some at times containing sugar, but no more than 10-20 g. in 24 hours 4. Avoidance of hypoglycemic reactions	1. Carbohydrates, including sugar, as desired, unmeasured diet, and maintenance or gain in weight 2. Blood sugar levels disregarded 3. Glycosuria disregarded, provided no symptoms of diabetes are present 4. Protamine zinc insulin or one dose of an insulin mixture daily 5. Strict avoidance of ketonuria

*Mosenthal, H. O.: Management of diabetes mellitus: an analysis of present-day methods of treatment. Ann. Int. Med. 29:79, 1948.

The third group has also been called the "Tolstoi School" after Dr. Edward Tolstoi who

---

EDGAR A. HAUNZ *is a member of the National Committee on Diabetes Detection of the American Diabetes Association; chairman of the Committee on Diabetes of the North Dakota State Medical Association, executive secretary-treasurer of the North Dakota Diabetes Association. For the past four years he has practiced in the department of medicine in the Grand Forks Clinic.*

*Presented at the monthly lecture program for physicians of Eastern Montana, sponsored by the Veteran's Administration Hospital, Miles City, Montana, April 11, 1952, and at the Clinical Conference on Diabetes sponsored by the George F. Baker Clinic at the 101st session of the American Medical Association on June 14, 1952.

evolved this plan and who himself terms it "Clinical Control"[2] or the "Clinical Approach." To most authorities this approach is scientific heresy but, whether or not such is the case, at least two important questions will eventually be resolved after prolonged observation of patients on this routine:

1. Are longevity impaired and complications enhanced by this liberalism?

2. Are we subjecting diabetics to needless sacrifice and expense in the other two "schools"?

It is indeed paradoxical that a disease for which a specific controlling agent is universally available should be managed so divergently by respective protagonists of these three schools of therapy. Whether one resorts to current textbooks or the literature the end result is still a "bewildering range of advice." Recently, Beaser[3] attempted to crystallize the current trends in therapy of diabetes by sampling the opinions of 200 diabetes specialists. This survey disclosed that "the overwhelming majority of diabetes specialists are still convinced of the advisability of aiming at normoglycemia as an ideal whenever feasible," notwithstanding the necessity of compromise in certain metabolically unstable and so-called "brittle" diabetics. This approach, championed most religiously by the Joslin group,[4–9] is based on the weight of evidence accumulated over the past three decades during which long standing diabetics have been subjected to scrupulous observation. One has but to read these reports to be convinced that at long last proof of a therapeutic rationale may be coming into focus. The "Free Dieters" still refuse to accept this, however, on the grounds that even with good control a large proportion of young diabetics develop vascular lesions after 25 years duration of the disease and, contrariwise, some poorly controlled diabetics may escape with minimal lesions. They believe that final judgment must be reserved for some time to come.

The preceding commentary is intended to justify somewhat the position of the author in discussing some of the problems encountered in routine management of diabetes. Certain of the suggested approaches that follow are based on inviolate physiologic and pathologic fact while others are more or less predicated on the "Middle of the Roader" attitude. Exemplary cases will be described.

THE "UNCOOPERATIVE" PATIENT

Not infrequently diabetics fail to cooperate with the physician in one or more ways. This manifests itself variously as cheating in their diet prescription, faking urine test reports, failing to return at stated intervals, and gross neglect in self-care. The general *affect* may be one of apathy, belligerence, or surreptitious acts to prevent others from discovering their affliction. Needless to say, some of these patients are frustrating to the physician and may prove refractory to every conceivable approach. They are more commonly seen in teenagers and adolescents, but no age group is exempt. However, the number of such cases can be significantly reduced if the physician realizes that in the successful care of diabetics he must assume the role of psychiatrist as well as clinician.

Emphasis should be placed on the patient who has the disease rather than on the disease which has the patient. When the physician meets a new diabetic patient he should remember that he is making a lifelong friend and therefore much of the success or failure that follows depends on the patient's first impression. Obviously, therefore, he cannot afford to see the patient, for the first time, in a hurry. Liberal time must be given to establish *rapport* with the patient. The newly discovered diabetic poses a real challenge to the physician who must break the news without creating undue alarm and yet not have the patient dismiss it lightly. One of the most effective ways to do this is to inform the patient that diabetes, properly and simply managed, is not a disease, but a disturbance in chemical function of the body which can be well regulated by diet, exercise and insulin (if the latter appears indicated). While this advice seems obvious and trivial, physicians too often fail to heed it and unnecessary personality complexes arise in the patient. Many persons in their fifth, sixth, and seventh decades still recall the grim specter of pre-insulin era patients with the "sugar sickness" whose wasted bodies and amputated limbs were symbolic of a living death. This indelible image in the minds of these people cannot be easily and instantly erased.

When a newly discovered diabetic, who will require insulin, appears to be uncooperative in accepting the facts and following through with the necessary period of instruction and stabilization of control (perhaps because of a sense of futility and hopelessness) the writer has found it most rewarding to show this individual the dramatic movie short "They Live Again"[10] which depicts the discovery of insulin and its salvation of the diabetic. If the same patient rebels against self-injection of insulin an additional brief movie is shown in which a boy aged four

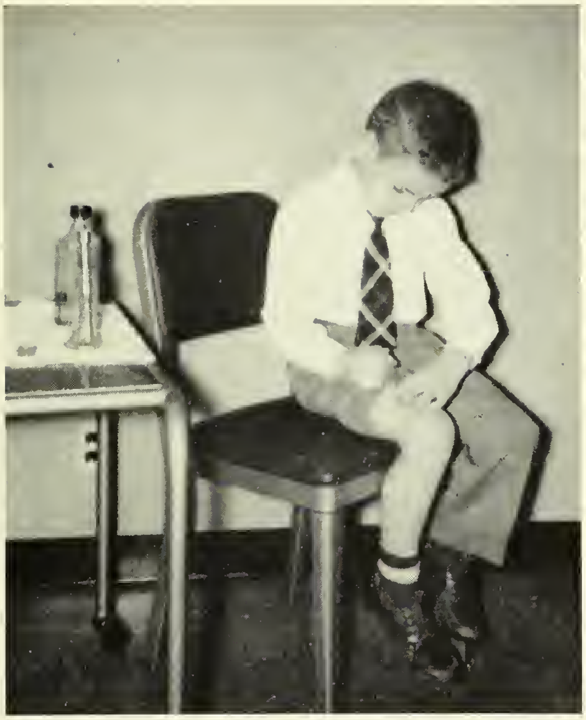

Fig. 1. Child, aged 4 years and 11 months (height above average), who learned to test urines and inject insulin himself only two weeks after the diagnosis was made.

years and eleven months measures and injects his own insulin with the greatest of ease (figure 1).

A large proportion of socalled "uncooperative patients" are simply cases which have not been previously exposed to thorough instruction in self-care of diabetes. In these cases it is initially the physician who has been "uncooperative." As Joslin states, "The education of the diabetic by the family doctor is a prerequisite to success. The doctor must associate with himself younger doctors, nurses, or nurses aides who can help him if he is overworked. An education is something the patient must have."[11] A dietitian is highly qualified to instruct diabetics since she not only can teach all the fundamentals of self-care including urine testing and insulin therapy, but also discuss with authority the most vital subject of all to the patient—the diet. While diabetic manuals are useful adjuncts, they represent a poor substitute for individualized instruction. Each patient requires a different approach and instruction must be at the level of that patient's intelligence. For example, more than one of Wilder's successfully instructed patients was deaf and dumb.

In summary, the incidence of uncooperative patients can be significantly reduced by the physician himself if greater finesse is exercised in introducing the patient to his disease, in proper education in self-management, and in the application of sound psychotherapeutic approaches to resolve personality conflicts which are so prevalent in these patients. An organized project has been in effect since 1950 at the May Institue for Medical Research (Dr. I. Arthur Mirsky) investigating the recent observations that the diabetic "has a personality structure different from that of the nondiabetic."

THE PROBLEM OF WEIGHT REDUCTION

It is not within the realm of this discussion to attempt a critical analysis of conflicting opinion regarding the ideal diabetic diet. Suffice it to say that all differences of opinion must eventually converge to a focal point of agreement on basic objectives, namely, to restore the patient to his normal weight and keep it at this level without compromise in nutritional balance. No one can deny that a competent dietitian is the ideal person to adapt the physician's dietary prescription to the individual patient.

Even the most expert therapeutist has his share of failures in reducing obese diabetics. The *percentage* of such failures is the point of distinction, and any practitioner who sees an appreciable number of referred diabetics will agree that it is unnecessarily high.

A diet inventory is essential in every patient before attempting to establish the optimal daily caloric intake necessary to effect a weight loss of from two to three pounds a week. This information is reconciled with height-weight charts, occupational background and some commonsense analysis of the individual patient.

Some suggestions which have been found of inestimable value in reducing obese diabetics are the following:

1. Discuss freely the dangers of obesity not only in diabetics but even in normal persons. Attempt to create in the patient a sincere desire to lose weight.
2. In a patient who is excessively obese do not immediately demand that the weight must be reduced to absolute normal. To hear that perhaps a hundred pounds must be "taken off" is a formidable thought, whereas if successive goals of perhaps 25 pounds each are set at intervals the patient is more apt to follow through.
3. If the patient is conveniently located, a visit to the doctor's office as often as every week (without charge) for a "weight check" is a very effective psychologic gesture by the physician. It is surprising how patients welcome this opportunity. At the same time necessary adjustments can be made in the diet.
4. If the obese diabetic is taking only a moderate dose of insulin which might be discontinued after adequate weight reduction, the patient is inspired to cooperate more sincerely with this knowledge. Conversely, it is of value to tell those who are not taking the hor-

mone that the latter may eventually have to be taken if the obesity worsens or is allowed to persist.

5. Because fasting and especially postprandial blood sugar levels almost invariably improve with correction of obesity, it is most impressive to demonstrate this to the patient even to the extent of plotting graphs. Exemplary graphs of other patients may be shown to those just beginning a reduction program.

Finally, after weight reduction has been achieved a socalled "maintenance diet" must be established. To prevent further weight loss, or even weight gain, the patient must expect to indulge in a certain amount of trial and error before the exact maintenance intake is determined. Often, however, patients who have been reduced to "normal" are pleasantly surprised to find that their maintenance diets are quite satisfying. Physicians who do not have access to a dietitian will find the series of six sample diets in the Diabetes Guide Book (published by the American Diabetes Association) very helpful. Exchange lists are also readily available.[12]

The following brief case reports illustrate the gratifying results which may be achieved by successful weight reduction, especially when previous efforts had failed:

Case 1. The patient, a woman aged 62, a known diabetic since 1936, had frequently tried to lose weight, unsuccessfully, until she was started on a rigid reduction program at the Clinic on April 15, 1951. Weekly followup checks on her weight and frequent readjustment of her diet were necessary to effect a weight loss of 58 pounds during the succeeding thirteen months. Needless to say, the patient was elated to hear that she could safely discontinue insulin therapy for the first time in sixteen years. Subsequent fasting blood sugar determinations (performed about twice a month) were reasonably low, and even a one and one-half hour postprandial blood sugar level was only 140 milligrams per cent. The urine was persistently sugar-free. The relationship of weight reduction to improvement in hyperglycemia and reduction of insulin dosage to zero is graphically shown in figure 2. The patient described a sense of well-being she had not experienced in many years. It is hoped that she will yet lose another 15 pounds.

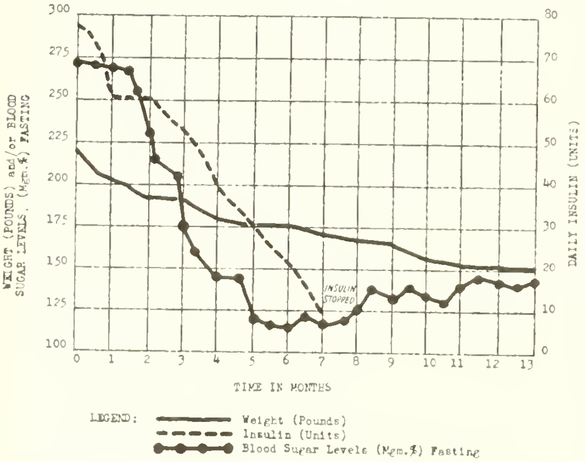

Fig. 2. Relationship of weight reduction to blood sugar levels and insulin dosage over a period of 13 months. *Case 1. A 62 year old woman was able to discontinue insulin therapy for the first time in 16 years by means of effective weight reduction. (Blood sugar levels were determined every two weeks or oftener.)*

Case 2. The patient, a woman of 56, a known diabetic since 1939, had weighed about 220 pounds constantly for at least 15 years. She was started on a rigid weight reduction program at the Clinic on March 15, 1951. This patient also required frequent followup visits with intensive psychotherapy and several readjustments in her diet to effect a weight loss of 54 pounds over a period of one year. On September 26, 1951, insulin therapy was discontinued for the first time in 13 years, or since the onset of her diabetes. The patient's urine has remained sugar-free and blood sugar levels, performed every three or four weeks, have not indicated any further need for insulin. The relationship of weight reduction to improvement in hyperglycemia and reduction of insulin dosage to zero is graphically shown in figure 3. She has been elated over the improvement in her mental and physical status. She is being urged to lose an additional 15 pounds.

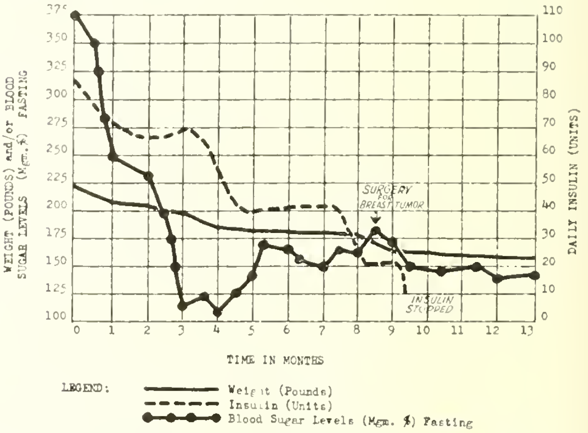

Fig. 3. Relationship of weight reduction to blood sugar levels and insulin dosage over a period of 13 months. *Case 2. A 56 year old woman was able to discontinue insulin therapy for the first time in 13 years by means of effective weight reduction. (Blood sugar levels were determined every three or four weeks or oftener.)*

The cases above are but two examples of many which could be cited to emphasize the importance of attempting to reduce every obese diabetic regardless of the number of times the patient may have failed in previous attempts. When the job is done, a more grateful patient is rarely seen. In addition to the economic and psychic value of eliminating the need for further insulin, the clinician aids in averting the threat of a worldwide shortage of insulin.

PREVENTION OF DIABETIC COMA

No physician who sees an appreciable number of diabetics can prevent ketosis from occurring at all times in all patients. This never has been and probably never will be accomplished by any regimen of management currently known to medical science. Conversely, it is a justifiable conviction that true diabetic coma (i. e., unconsciousness with all the classical findings of this state) should *never* occur among known diabetics, properly instructed and properly managed, except in rare inescapable situations, an example of which might be a patient who is isolated from civilization through some catastrophe such as an airplane crash or shipwreck, finding himself without insulin and equipment to test his urine. If coma occurs otherwise it may be considered to be the fault of the patient, the physician, or both.

The prevention of true diabetic coma has, in the writer's experience, been achieved by the following measures:

1. Every new diabetic, whether or not previously in coma, is thoroughly apprised of the gravity of this state and its high mortality. He is told it should never and will never occur if he obeys instructions.
2. The patient is instructed to test *every urine specimen for acetone*[*] *whenever 4 plus glycosuria appears.* He is to continue testing subsequent specimens similarly until acetone (if present) disappears for at least 48 hours. If the acetonuria persists for 8 to 12 hours, his physician must be immediately contacted. Under no circumstance should he await the appearance of signs and symptoms. The etiologic role of infections in acidosis and coma is, of course, stressed.
3. No diabetic is permitted to test his urine for sugar less than twice daily, except very mild cases who require only a qualitative diet. (In the latter instance one test daily is required, preferably 1½ hours after lunch.

The following case exemplifies the value of this approach:

A woman of 27, known to have had diabetes for twelve years, is a so-called true "brittle" diabetic patient, recently reported by me.[13] She had been in diabetic coma several times during eight years prior to my seeing her. Despite some initial personality difficulties, she became a most cooperative patient, following a course of detailed instruction. Every attempt to achieve good control of her diabetes was still fraught with numerous instances of acidosis requiring hospitalization at irregular intervals averaging every 5 to 7 weeks. However, she has never failed to seek medical attention immediately upon discovering persistent acetonuria and as a result has never developed true diabetic coma during the four and one-half years she has been under my supervision.

In summary, the prevention of diabetic coma is most effectively exercised at the patient level by a simple test for acetone, a substance of low toxicity, which fortunately almost invariably presages clinical acidosis and/or diabetic coma well in advance of the incident. While ketosis is an "absolutely constant finding in diabetic acidosis"[14] it is well to remember that it may be independently induced by salicylates, antipyrine, cyanates, acetates, exposure to x-rays, alkalosis, anxiety, starvation, vomiting, major infections, fractures, exhaustive exercise, major surgery, and intestinal obstruction. Transient acetonuria occurs very readily in diabetic children and is not always of serious significance. Finally, severe hypoglycemia may occasionally incite ketosis by excessive depletion of liver glycogen which forces the liver to metabolize excessive amounts of fat.[15,16]

PROBLEMS IN THE USE OF INSULIN

The intelligent use of insulin is not always a simple matter. In the individual case of diabetes the clinician must reconcile the metabolic type of patient with the appropriate type of insulin. Here again, as in the case of diet, every attempt should be made to fit the type of insulin to the type of patient rather than fit the patient to the insulin.

The Metabolic Type of Patient. If the patient has diabetes of several years duration it is often valuable to find out what kinds of insulin he has tried and the results obtained therefrom. A longstanding diabetic has more than once embarrassed the physician who fails to heed the experience of the patient before attempting a change in dosage or type of insulin. Thus, the patient may have learned from bitter experience that violent and frequent hypoglycemic reactions occur from one kind of insulin while another type may be better tolerated and perhaps more effective.

It is often important to determine through observation of fasting and postprandial blood sugar profiles whether a given patient manifests so-called overproduction of glucose, under-utilization of glucose, or both,[17] as a guide to selecting

TABLE II

Mechanism of Under-utilization and/or Overproduction of Sugar by Deficiency of Insulin in Diabetes Mellitus[*]

Glucose Under-utilization	Glucose Overproduction
1. Decreased glycogen assimilation in the liver, muscles and skin	1. Increased mobilization of glucose from liver glycogen
2. Retarded conversion of glucose into fat	
3. Retarded combustion of glucose	

[*] Mosenthal, H. O.: Problems in management of severe diabetes, Journal-Lancet 71:493, 1951.

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[*] It is well known that the simple tests for acetone by means of powder (Denver Chemical Co.) or tablets (Ames Company) are definitely over-sensitive. In the author's experience, only a *deep purple* color change is reliably significant to indicate ketosis. Therefore, patients are spared unnecessary concern and anxiety if they are told to discount lighter tones of purple color as probably insignificant. This prevents "false alarms."

the appropriate insulin whose time-action curves tend to coincide with hyperglycemic intervals (see table II). A relatively normal fasting blood sugar followed by severe postprandial hyperglycemia occurs in cases of "under-utilization" while the state of "overproduction" of glucose (from the liver) is reflected in high fasting blood sugar levels in the presence of normal postprandial levels. It is obvious that mixtures of intermediate insulin preparations should possess an appropriate ratio of slow and quick acting components, commensurate with fasting and postprandial blood sugar curves.

When the patient, after detailed observation and sincere cooperation, proves to be a so-called true "brittle" diabetic[13] the writer has found that with few exceptions only unmodified insulin in multiple doses will achieve any reasonable degree of control, particularly in minimizing severe hypoglycemic episodes. An exemplary case is the following:

> A girl aged 17 had been diabetic for 7 years. She had had three episodes of diabetic coma and had repeated severe insulin reactions (often with unconsciousness) alternating with almost daily fluctuations of excessive hyperglycemia and ketosis. Attempts to establish good control with various combinations of long and short-acting insulins were futile. A gradual personality change had occurred, the patient becoming melancholy and introspective with defective memory. Finally, doses of regular insulin were given daily in amounts established by daily blood sugar "profile" studies (see figure 4). The total daily dose was 134 units. Thereafter, insulin reactions were minimized and ketosis was consistently absent although the degree of glycosuria was erratic. By far the most gratifying result was a dramatic improvement in the patient's mental depression and memory. She has continued successfully on this program for the past three years, and it is now obvious that her previous mental disturbances were due to chronic reversible cerebral damage from repeated hypoglycemic reactions incident to long-acting insulins.

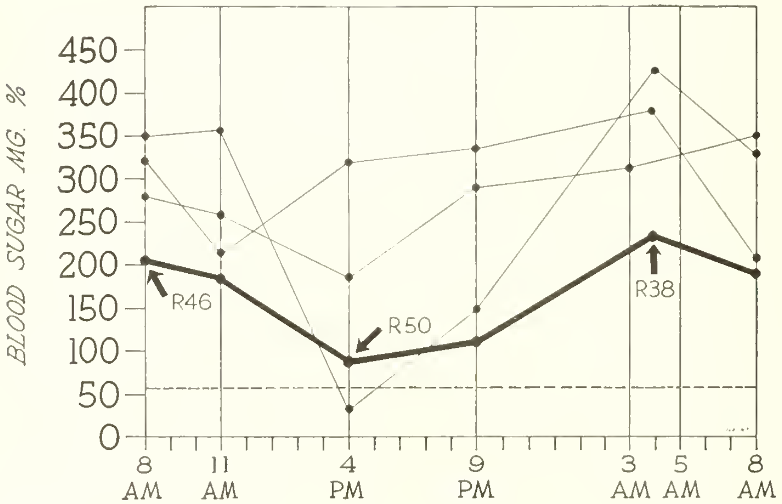

Fig. 4. Blood sugar profiles in a 17 year old girl.

The Appropriate Type of Insulin. From the previous remarks it is obvious that the type of patient largely determines the type of insulin indicated. Every effort should be made to withhold insulin from very obese diabetics until weight loss is effected, unless acidosis threatens in the absence of the hormone. Insulin complicates the problem of weight reduction by stimulating the appetite.

One is more often confused than enlightened by the voluminous medical literature expounding the pros and cons for various types of insulin. However, NPH insulin is here to stay and is often superior in the average case. Mosenthal[17] points out that the value of protamine insulin under 30 units daily is still "universally acknowledged." To date one hundred and ten of my diabetic patients have been either started on NPH insulin or transferred to this new preparation. Not a single case has had to revert to a previous preparation although in seven instances admixture with unmodified insulin has proven necessary. The ease of conversion from protamine or "tailor-made mixtures" of protamine and crystalline insulin to NPH insulin is noteworthy. Experience has shown that it is advisable to start with a dose of NPH insulin about 10 to 15 per cent less than the total dose of whatever insulin the patient was previously taking to provide a margin of safety against possible hypoglycemia which would not impress the patient. While NPH insulin represents a mixture of unmodified and protamine insulin in a ratio of 2:1 this does not preclude eligibility of patients on other ratios of individualized mixtures for conversion to NPH. Less than one-third of the above series of cases were on such a ratio of mixtures before conversion. Curiously enough, a number of these patients actually exhibited improved stability of control on NPH insulin. This is illustrated by the following case:

> A man, aged 29 years, was a known diabetic for 15 years. From March 1949 to November 1950 he had taken individualized mixtures of regular and protamine insulin in various ratios (usually 2:1) plus an additional late afternoon injection of regular insulin, but was unable to avoid erratic glycosuria, frequent hyperglycemia and insulin reactions, the latter occurring about four times a month. In November 1950 conversion to an equivalent dose of NPH insulin was effected. Within a few days his diabetes became remarkably stable and to date (March 1952) he has had only one mild reaction, his fasting blood sugar levels are normal, and the urine remains almost totally sugar-free (see table IV) on a dose of only 48 units once daily, compared with a previous total requirement of 56 units daily. Since his occupation is that of truck driver, the patient is grateful that hypoglycemic reactions are virtually eliminated.

The other patients referred to have shown similar, but less dramatic, improvement in metabolic equilibrium when converted from other types of insulin to NPH insulin.

Even in severe diabetics Dolger has found NPH insulin successful in controlling about 40 per cent of cases.[18] It should be remembered that, unlike mixtures of protamine and regular insulin, the effects of NPH with admixture of regular insulin are essentially the same as occur when the two insulins are injected separately.[19]

Globin insulin has been used in only a few select cases by the author. It is sometimes of distinct value in cases allergic to other modified insulins, and in occasional severe diabetics. It is also said to be often successful in older patients who require 40 units or less daily as a single injection.[20] However, Lawrence[21] believes it is probably no better than other types and that a single morning dose is poor treatment for severe diabetics. The effects of globin insulin do not overlap sufficiently from one day to the next to permit a single injection in severe cases.[22] On large doses, unnatural distribution of feedings is often necessary. The clinical report of Roberts and Yater is probably the most favorable to date.[23] The literature on globin insulin is confused with a great deal of conflicting opinion and is probably best summarized by the statement that "differences in action among the three intermediate insulins are less important than differences in insulin requirement and response of various patients with diabetes mellitus." [24]

A highly potent unmodified insulin has recently appeared on the market.* It contains 500 units of unmodified insulin per cubic centimeter. It is of distinct value in cases of true insulin resistance, since the huge doses may be administered in relatively small volumes. Obviously, extreme caution is necessary in its use. While it was apparently no more effective than other preparations in a case I recently reported,[25] remarkable improvement in stability of control was achieved with a total of 116 units daily (in two divided doses) in a 61 year old diabetic woman who was previously poorly controlled on as much as 150 units of U 80 insulin daily. (The

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*Manufactured by Eli Lilly and Co.

TABLE IV

Days on Insulin Mixtures and "Regular" Insulin Supplements

Days	1	2	3	4	5	6	7	8	9	10	11	12	13	14
8:00 A.M.	T	4	0	4	0	4	0	0	4	0	0	T	0	4
11:00 A.M.	4	0	3	0	4	4	3	3	1	4	1	3	3	0
5:00 P.M.	4	0	3	0	0	1	0	0	2	2	0	0	2	0
9:00 P.M.	4	0	3	0	0	1	0	0	4	1	0	0	2	0

Days on NPH Insulin

Days	1	2	3	4	5	6	7	8	9	10	11	12	13	14
8:00 A.M.	0	1	T	0	0	0	0	0	0	0	0	0	0	0
11:00 A.M.	0	0	0	0	0	0	T	0	0	0	0	0	0	T
5:00 P.M.	T	0	0	0	0	0	T	0	0	0	0	0	0	0
9:00 P.M.	1	0	0	0	0	0	0	0	0	0	0	0	0	0

Degrees of glycosuria recorded during two comparable periods of 14 days each in a diabetic man, aged 29. Note the decided improvement in glycosuria after conversion to NPH insulin (lower chart), in comparison with corresponding urine tests during therapy with individualized mixtures and supplements of regular insulin (upper chart). (See text.)

Benedict's test graded as follows: 0—No glycosuria; T—Trace of glycosuria; 1—One plus glycosuria; 2—Two plus glycosuria; 3—Three plus glycosuria; 4—Four plus glycosuria.

latter case, by definition, should be termed "insulin insensitive[26] rather than insulin resistant.) In some cases only one dose of U 500 insulin daily has been adequate. Anyone using this powerful preparation should be alerted to the fact that insulin resistance may suddenly disappear, precipitating severe spontaneous hypoglycemia![27]

PITFALLS IN REGULATION OF INSULIN DOSAGE

After the appropriate insulin has been selected for the individual diabetic patient in terms of the above suggestions, the subsequent regulation of insulin dosage may be subject to one of two pitfalls, namely, the high and low renal thresholds for glucose. The normal renal threshold for "true" blood sugar has been shown to vary from 99 to 228 milligrams per cent, 80 per cent of cases varying from 140 to 190 milligrams per cent. In diabetics I have found that a much wider range exists. Therefore, in a significant percentage of cases there is distinct hazard of underdosing high renal threshold and overdosing low renal threshold diabetics with insulin on the basis of urine tests. The pregnant diabetic is indeed no exception to the "physiological" low renal threshold characteristic of the normal pregnant woman and, in these cases especially, insulin should be prescribed according to blood sugar levels rather than urine sugar levels.[29] The entire problem of the renal threshold for glucose is further enhanced by the fact that even in the individual case it is sometimes quite fluctuant. It is well known, of course, that older diabetics often have a high threshold (up to 350 milligrams per cent), but this group is not devoid of the opposite extreme.

It is therefore most important that both fasting and postprandial blood sugar levels be determined as often as necessary to definitely establish the reliability of urine sugar tests as a guide to insulin dosage[30] in every diabetic taking insulin. The following case illustrates the difficulty which may be encountered in estimating proper insulin dosage when the renal threshold is extremely fluctuant:

A three year old child was admitted to the hospital on June 16, 1950, in severe acidosis. She responded well to the usual therapy and has since been relatively well controlled but continually exhibits wide unpredictable fluctuations in her renal threshold for glucose. Fasting and postprandial blood sugar levels have been the only reliable guide to regulation of insulin dosage. Urine tests are performed four times daily, but chiefly for the purpose of early recognition and prevention of acidosis. Of curious interest is the fact that hypoglycemic reactions do not occur in this case until the blood sugar is below 26 milligrams per cent. Comparisons of blood sugar levels with simultaneous Benedict's tests for glycosuria on "second specimen" voidings of urine are shown in table III. Samplings of fasting and postprandial blood sugar and urine specimens were taken from data collected since June 1950.*

TABLE III

Erratic Renal Threshold in the Case of a 3 Year Old Diabetic Child

Comparison of "true" blood sugar levels and simultaneous (Benedict's) urine sugar tests on socalled "second voidings." (Samplings over a 2-year period)

Blood Sugar Level (Mg. %)	Urine Sugar Test (Benedict's)	Blood Sugar Level (Mg. %)	Urine Sugar Test (Benedict's)
191	0	254	T
266	2	168	4
214	3	98	4
250	4	101	0
115	0	32	2
115	T	58	0
173	4	114	4
150	0	76	2
90	4	36	1
197	4	163	4

Benedict's test graded as follows: O—No glycosuria; T—trace of glycosuria; 1—One plus glycosuria; 2—Two plus glycosuria; 3—Three plus glycosuria; 4—Four plus glycosuria.

(If the discrepancy between blood and urine sugar levels were simply due to abrupt changes in amount of glycose in the blood and not to a fluctuant renal threshold one would not expect to find the sugar-free "second voidings" which were obtained only a few minutes after hyperglycemic blood samples were drawn and, conversely, four plus glycosuria on other occasions only a few minutes after hypoglycemic or normoglycemic blood samples were drawn.)

In high, low, and especially erratic renal threshold diabetic patients it is obviously important that blood sugar determinations must be critically accurate to avoid misinterpretation of the clinical problem posed and to insure optimum calibration of insulin dosage. It has been repeatedly emphasized that only "true" blood sugar methods are reliable in these situations as well as in the case of glucose tolerance tests.[31–33] Indeed, the Folin-Wu and similar methods which include non-glucose reducing substances may yield values as much as 78 milligrams per cent higher than the actual blood glucose level, particularly in cases of hyperglycemia. In our laboratory, the Somogyi-Nelson method has proven most satisfactory, and it is no more difficult than the old Folin-Wu method.

SUMMARY

An attempt has been made to review some current therapeutic concepts of diabetes mellitus and certain basic principles of management of the disease in its uncomplicated form. Exemplary cases are cited. If this treatise contributes toward a sustained enthusiasm for better care of the diabetic it will have served its purpose.

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DR. DWIGHT INGLE TO GIVE JOURNAL-LANCET LECTURE

The tenth Journal-Lancet lecture will be given on December 5, 1952 at the University of Minnesota medical school by Dr. Dwight J. Ingle, pharmacology research division, The Upjohn Company, Kalamazoo, Michigan. Dr. Ingle, who did graduate work at the University of Minnesota and the Mayo Foundation at Rochester, is particularly interested in carbohydrate metabolism and adrenal cortical research. His subject will be "Some Studies on Experimental Diabetes."

Treatment of Poliomyelitis With a Sympatholytic Drug*

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FOLLOWING the introduction of the Kenny method of treatment of acute anterior poliomyelitis to relieve the pain and spasm accompanying this disease, various drugs have been tried in an attempt to alleviate these symptoms. Among drugs reported as successful in treatment have been curare,[1] intravenous procaine,[2,4] tetraethylammonium chloride,[3] and Priscoline.† Although these drugs have the properties of autonomic blocking agents, the main sites of action are not common to all. Curare acts mainly on the neuromuscular junction and to a lesser extent on the autonomic ganglia. Procaine, in addition to its anesthetic property, is curare-like in its action on the neuromuscular junction and ganglion cells and also affects preganglionic synaptic fibers.[5] Tetraethylammonium chloride and Priscoline act on the autonomic ganglia.

In the face of an epidemic of threatening proportions and with limited facilities for the use of Kenny packs, it appeared desirable in the summer of 1949 that an adjunct method of treatment be attempted and evaluated. The method of Smith and coworkers[4] with Priscoline seemed to us especially worthy of trial because of ease of administration and reputed low toxicity as well as the good results reported.

The rationale for therapy with this type of drug is based on the assumption that the pain and spasm of poliomyelitis result from the involvement of the sympathetic nervous system, either in the anterolateral horn of the spinal cord or in the peripheral ganglia. Smith and his coworkers[6] have presented evidence for such involvement based on clinical observations, two necropsied cases (not correlated with the clinical observations), and on oscillometric readings on the extremities. However, others, such as Bodian,[7] report lesions of the autonomic nervous system as uncommon findings and tend to favor lesions in the brain stem as causing spasm. Nevertheless, the apparent success of Smith and coworkers[6] prompted us to use the product in a similar manner.

Unfortunately, this study was not well planned for a proper statistical analysis on the basis of alternation of treated cases and controls. The suddenness with which large numbers of patients were admitted and the relative shortage of medical and nursing personnel precluded satisfactory organization of a program. Early in the study, the selection of patients followed no set pattern, the first patients treated being some who did not respond well to hot packs; others were placed on Priscoline therapy because they developed spasm after admission. Later, patients were placed on the drug at the time of admission to hospital. Because of the shortage of personnel in the face of a sizable outbreak, observations were not made as carefully and frequently as desired. In a few instances, the medication was not given as ordered. Nevertheless, realizing the limitations of this study, we believe certain observations are warranted.

MATERIAL AND METHODS

From June through December 1949, 679 poliomyelitis patients were admitted to the Herman Kiefer Hospital. Of this number, 122 patients were treated with Priscoline. On examination of the clinical records, 21 patients were excluded from the series for various reasons. Observations on 10 patients were inadequate as a basis for judging the effect of treatment. The drug was used on 7 patients for so short a time or it

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†The Priscoline used in this study was furnished by Ciba Pharmaceutical Products, Inc.

was so irregularly given that no judgment as to its effect was warranted. In one instance, a patient expired within 36 hours of treatment. Untoward or side reactions led to discontinuance of medication in three instances.

Of those remaining in the group to be evaluated (101 patients), further breakdown of cases into three groups was necessary. Thus 88 patients were given adequate courses of the drug (for 48 hours or longer) with no other treatment for spasm; 9 were treated with it after the use of hot packs; and 4 patients were treated with hot packs and Priscoline simultaneously.

The distribution by type of disease for all cases treated with Priscoline and those treated with the product alone are shown in table I.

TABLE I

Poliomyelitis, Herman Kiefer Hospital, 1949

Distribution by Clinical Type

Type	Total Cases No.	Total Cases Pct.	Priscoline Treated No.	Priscoline Treated Pct.
Nonparalytic	281	41.4	42	48.0
Spinal	227	33.4	33	37.5
Bulbar	77	11.3	4	4.5
Spinobulbar	77	11.3	9	10.0
Encephalitic	9	1.4		
Other	8	1.2		
Total	679	100.0	88	100.0

It will be noted that the proportion of treated cases by clinical type approximate rather closely the distribution by type of all patients with poliomyelitis admitted to the Herman Kiefer Hospital in 1949.

TABLE II

Poliomyelitis, Herman Kiefer Hospital, 1949

Results with Priscoline According to Clinical Type

Clinical Type	Good No.	Good Pct.	Fair No.	Fair Pct.	Poor No.	Poor Pct.	Totals No.	Totals Pct.
Nonparalytic	26	61.9	8	19.0	8	19.0	42	48.0
Spinal	7	21.2	7	21.2	19	57.6	33	37.5
Bulbar			4	(100.0)			4	4.5
Spinobulbar	3	(33.3)	4	(44.4)	2	(22.2)	9	10.0
Total	36	40.9	23	26.1	29	33.0	88	100.0

Dosage and route of administration. Although early in the study, several routes of administration and a varied dosage were utilized, the schedule of treatment outlined by Smith et al[6] was soon adopted. Patients up to five years of age were given the elixir preparation in dosage beginning with 10 mg. every four hours and increasing each dose by 10 mg. until a generalized flush was produced. Dosage was maintained at this level every four hours until discontinued. Patients from 5 to 12 years of age were given 25 mg. of the injectable form intramuscularly every four hours for two days and then 25 mg. by mouth every four hours with adjustment to tolerance until discontinued. Patients over 12 years of age were given 50 mg. intramuscularly every four hours for two days and then 50 mg. by mouth every four hours, with adjustment to tolerance until discontinued. The highest dose used for the age group 12 years or older, was 75 mg. every four hours and this dosage was tolerated well in most instances.

Length of treatment. The average length of treatment was 11 days. For those on treatment for two weeks or less (the great majority of patients) the average length of treatment was five days. A few patients were maintained on Priscoline therapy for long periods of time to observe the effect of the drug on maintained spasm in convalescence. Ten patients were treated for more than four weeks; one for 73 days.

RESULTS OF TREATMENT

The number of patients (13) treated by hot packs and Priscoline was too small to consider separately particularly because of the difficulty of assessing multiple treatment. Only patients treated with the preparation alone were considered. The results according to improvement as observed in the group of 88 patients treated with Priscoline alone were rated according to improvement as good, fair, or poor. Patients in whom spasm disappeared, or if residual, was only slight by the end of two weeks of therapy, were classified as "good." Patients who showed improvement but had moderate residual spasm by the end of therapy were classified as "fair," while those showing no or only slight improvement were classified as "poor."

When considered by type of disease, the results observed were encouraging in the nonparalytic group (table II). However, in the group with spinal involvement the results were almost exactly reversed. The bulbar and spinobulbar groups comprise only 13 patients and the results were equivocal as would be expected in these types. Although there was no control

TABLE III

Poliomyelitis, Herman Kiefer Hospital, 1949

Results with Priscoline According to Day of Disease Treatment was Begun

Day of Disease	Good No.	Good Pct.	Fair No.	Fair Pct.	Poor No.	Poor Pct.	Total No.	Total Pct.
2 to 3	18	52.9	9	26.5	7	20.5	34	38.6
4 to 5	10	34.5	6	20.7	13	44.8	29	33.0
6 to 7	4	40.0	3	30.0	3	30.0	16	11.4
8 to 14	3	27.3	4	36.4	4	36.4	11	12.5
15 plus	1	(25.0)	1	(25.0)	2	(50.0)	4	4.5
Total	36	40.9	23	26.1	29	33.0	88	100.0

study, during this epidemic there were a number of cases of the non-paralytic type, with slight or moderate spasm, who improved without any type of treatment. Consequently, to conclude that a particular drug is efficacious in relieving spasm, the effect should be produced in the paralytic type of poliomyelitis.

When considered by age groups there are no significant differences noted for a study (sample) of this size.

The results were also examined with relation to the time interval from onset of illness until Priscoline therapy was begun and are presented in table III. It would seem that there was a significant difference between the group in which treatment was begun on the second or third day and the groups in which treatment was begun later. However, review of cases revealed that almost half of the non-paralytic patients were treated early while less than one-third of the other types came to treatment early.

UNTOWARD REACTIONS

Of the 122 patients given Priscoline in this series, there were untoward or side reactions in 13 patients. The symptoms, in order of frequency, were nausea in 11 instances, vomiting in eight, rash in two, severe flush in one case, and chills and dizziness in one instance. Only on three occasions were symptoms sufficient to require discontinuance of therapy. In one case, nausea and vomiting persisted in spite of temporary discontinuance of therapy and treatment had to be discontinued permanently. The severe flush mentioned above was caused by excessive dosage in a three year old patient. In the third instance of cessation of therapy, the patient had developed a rash. This was probably miliarial, in which case therapy might well have been continued without serious consequences.

DISCUSSION

Subsequent to the completion of our study, there appeared in the literature a more detailed report of the work done by Smith and coworkers in 1948.[8] A somewhat different routine of dosage is described than that given in the preliminary report, with frequently a higher level of dosage than that given by us and continuation of intramuscular administration until pain and muscle spasm subsided, rather than just for 48 hours as reported earlier. The highest dose reported was 112.5 mg. every four hours, whereas the highest single dose in this study was 75 mg. every four hours.

It is possible that this difference in routine might explain the discrepancy between the two studies, but it is our opinion that it is not the full explanation. The notable lack of success in the group of patients with spinal involvement, as compared with non-paralytic patients, leads us to believe that there are other or more obscure factors involved. When one considers the disagreement among pathologists as to the importance of the lesions of the sympathetic nervous system in poliomyelitis, the use of sympatholytic drugs must be evaluated with great care.

From our results, we conclude that Priscoline is of some benefit in the management of patients with acute anterior poliomyelitis. Originally, it was intended by the method of alternation to compare the value of the drug with Kenny packs but under the circumstances this was not possible. However, from a clinical standpoint Priscoline appears to be as valuable as Kenny packs and on the basis of economy, convenience and ease of treatment, it would appear to be more useful in patients with no paralysis and in those with slight to moderate paralysis. The drug should be given an early trial in all cases in which spasm and pain are present and packs can be added when necessary. In the presence of a large outbreak and in view of the continuing shortage of nurses and other hospital personnel, it would be advisable to use Priscoline.

CONCLUSIONS

1. Priscoline was used in the treatment of spasm in 122 cases of acute anterior poliomyelitis. For various reasons, 21 cases were eliminated from analysis and of the remainder, there were 88 treated with Priscoline alone.

2. Results with Priscoline in our hands were notably good in the non-paralytic group, but relatively less good in patients with paralysis.

3. In the management of non-paralytic poliomyelitis, Priscoline appears to be as good as Kenny packs and economically there is a great advantage in its use.

4. Limitations of the study precluded statistical comparison of Priscoline and Kenny packs on an alternating patient treatment basis.

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(Continued on page 496)

Diagnosis of Carcinoma of Right Colon

*Review of Twenty-one Cases**

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MALIGNANCY of right side of the colon is frequently described as usually causing unexplained anemia, weakness, weight loss, change in bowel habit, and rarely causing pain or obstruction. The fact that pain and obstruction have been prominent symptoms in tumors of right colon seen recently, has prompted a review of the cases seen in the last five years and a correlation of the symptom patterns with a review of the literature.

MATERIAL

All proven cases of malignancy of the colon proximal to the mid-transverse colon which were observed at the Fargo Clinic for a five year period from 1947 through 1951 were included. There were twenty-one cases.

CLINICAL FEATURES

There were eight women and thirteen men. The oldest was 84, the youngest 29, with an average of 60.5 years. There were eight tumors of the cecum, eight of the ascending colon, and five of the right half of the transverse colon.

SYMPTOMATOLOGY

The findings shown in table I compare with the findings of Brown, Colvert, and Brush[1] in which pain was a symptom in 76 per cent of cases; Person and O'Neill,[2] 84.3 per cent cases; Butler and Bargen,[3] in 84 per cent cases. The total cases in ours and the three series referred to is 271. Pain was a prominent symptom in 224 for an incidence of 82.6 per cent of the 271 cases.

Pain was the first symptom in fourteen of twenty-one cases, or 66.6 per cent. The pain was located generally in the right or midabdomen and in fifteen cases was colicky or recurrent in character. The pain was estimated to be due primarily to the narrowing of the lumen of the bowel in fifteen cases (71.4 per cent). Five (23.8 per cent) cases either were observed during periods of complete obstruction with the usual findings or gave a history of episodes of severe colicky, abdominal pain with distention, nausea, and vomiting, which were considered to be periods of temporary complete obstruction. There was some degree of obstruction present in at least 71 per cent. Change in bowel habit was noted in seven (33.3 per cent). This consisted of one with alternating periods of constipation and diarrhea, one with constipation and five with diarrhea. Brown and coworkers report an incidence of diarrhea in 20 per cent, constipation in 13 per cent; Person and O'Neill[2] diarrhea in 23 per cent and constipation in 32 per cent.

TABLE I

Symptom	Number of Cases (21)	Per Cent
1. Pain	18	85.7
Pain as first symptom	14	66.6
Obstructive pain	15	71.4
2. Change in bowel habit	7	33.3
Alternate constipation and diarrhea	1	
Constipation, first symptom	1	
Loose stools	5	
3. Nausea, vomiting or anorexia	6	28.6
as first symptom	2	9.5
4. Anemia symptoms or findings of weakness	3	14
5. Episode of complete obstruction	5	23.8
6. Episode of appendicitis	2	9.5
7. Gross blood in stool	1	

Pain was the most common complaint in 18 (85.7 per cent) cases

Nausea, vomiting or anorexia was present in six (28.6 per cent) and was the first symptom in two cases. Symptoms related to anemia were the first symptoms in two and in the third an anemia of 9.3 grams per cent was found on an employment examination which led to the discovery of carcinoma of the cecum although there were no complaints.

In the first case of anemia the patient had consulted the doctor because of weakness. A secondary anemia was found which responded to iron therapy. Twelve months later the patient

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*EDITOR'S NOTE: The treatment of same series is discussed by Dr. Hall, page 476.

noted gross blood in the stool. Following this a colon examination revealed a tumor of the ascending colon. The second had consulted his doctor for weakness and light headedness and blood examination showed hemoglobin 10.4 grams per cent and RBC 4.21 million. A cholecystogram revealed stones in the gall bladder. The blood picture returned to normal on iron therapy but the patient was admitted to the hospital eighteen months later with an acute bowel obstruction and a lesion of the ascending colon was then demonstrated. No stool tests were performed on the first two. On the third, when the anemia was found, the stool was found positive for blood and barium enema revealed a tumor of the cecum.

Two cases presented an appendicitis-like picture and one had been opened for appendectomy. This is quite common in right sided lesions. Mayo[4] reports that 15 per cent of the cases treated at the Mayo Clinic had had appendectomies after onset of symptoms. This is in agreement with the figures of Jarvis and Cayer,[5] in a review of fifty cases of cancer of the cecum, which revealed that seven had had appendectomy in the preceding twelve months without relief of the patient's symptoms.

There was history of gross blood in the stool in only one case.

TABLE II

PHYSICAL AND LABORATORY EXAMINATION

	Number of Cases	Per Cent
Palpable mass	12	57
Hemoglobin less than 12, 12 cases tested	12	60
17 stool tests for occult blood (Benzidine)	16 pos.	94
15 stool tests for occult blood (Guaiac)	4 pos.	26.6
Barium enema, 18 cases	18 pos.	100

Of the twenty-one cases, twelve (57 per cent) had a palpable abdominal mass. Of the nine in which no mass was palpable five exhibited moderate to high grade obstruction with distention and tenderness of the abdomen, and one had a fresh appendectomy wound, conditions which preclude easy palpation of intraabdominal masses. Thus, in the fifteen without obstruction a mass was palpable in 80 per cent of cases. Butler and Bargen[3] report a palpable mass in 72 per cent of fifty cases of right colon lesions and found that a palpable mass reduced the resectability only from 78 to 66.1 per cent. Person and O'Neill found palpable mass in 95 (67.8 per cent) of 140 cases and Brown and coworkers in 38 (63 per cent) of sixty cases with palpable masses. Combining the series there were 271 cases with palpable mass in 181 (66.4 per cent).

Twenty cases had blood examination, twelve of which showed a hemoglobin of less than 12 grams per cent. Of the eight with normal hemoglobin the highest was 16.2 grams per cent. Of the twelve with anemia the lowest was 6.41 grams per cent.

Seventeen stool specimens were tested for occult blood. Sixteen were graded 2 plus or stronger by Benzidine test and one was reported as a trace and considered negative. Fifteen were also tested by guaiac method, eleven of which were negative.

X-ray examination is a highly accurate method of detecting right colon lesion in a well prepared patient. Of the eighteen cases examined the lesion was detected in all eighteen. One had x-ray examination elsewhere, eight weeks previous after an acute obstructive episode in which the lesion was not detected. This patient had a hepatic flexure lesion. The lesion was suspected on the first x-ray examination at St. Luke's Hospital and confirmed on x-ray two days later.

In the literature it is considered a good average if x-ray in the hands of a well trained radiologist is positive in 90 per cent of the cases. Brown and Colvert[6] in a report of accuracy of x-ray in fifty right colon lesions found diagnosis made on first barium enema in thirty-six cases. In ten additional cases the diagnosis was made on repeat examination. The repeat examination was either at the request of the radiologist because of poor preparation of the patient or the clinician because of strong clinical symptoms. In four cases, the x-ray examination was negative.

The average duration of symptoms before surgery was 6.6 months. The average delay between the first visit to the doctor and the establishment of the diagnosis was 2.1 months. This delay was accounted for almost entirely by the two cases with anemia as a presenting complaint with twelve months in one and eighteen months in the other. For the other nineteen cases the average delay in diagnosis was .2 of a month.

Thus, although anemia without other symptoms does not appear to represent the early symptoms of carcinoma of the right colon in the majority of cases, it does occur and these are the cases which are apt to escape early detection unless an explanation for the anemia is studiously searched for. This should include proof that the stools are negative for occult blood by the Benzidine test. This nearly always consists of having the patient omit all meat and meat stocks from the diet for a period of at least three days and then collecting specimens for examination. Patients that persist in showing positive reaction for blood under these circumstances should be considered candidates for x-ray examination, particularly if they show anemia and even if they have hemorrhoids. It is hardly necessary to mention that neoplasms elsewhere in the gastro-intestinal tract warrant consideration when there is occult blood in the stool as tumors in the stomach and elsewhere in the colon are frequently responsible for anemia. The significance of a negative guaiac test in our experience is nil. Discounting the significance of a positive Benzidine test because the patient has not abstained from meat for three days and because the guaiac test is negative is of little value.

About 50 per cent of all fatal cancers are in the gastro-intestinal tract. These are divided about half and half between the stomach and the colon and rectum. The majority of colon lesions, about 70 per cent (Rankin[8]), are within the reach of the rectal finger or the proctoscope and can be detected by relatively simple means. The rest are about evenly divided between the right and left side of the colon. Lesions in the stomach are often advanced and have metastasized by the time they cause symptoms. Lesions in the colon remain localized much longer.

As there is no practical way at present to discover cancer of the bowel before it manifests symptoms or signs it behooves the clinician to be acutely aware of these symptoms and signs that he may follow them up and discover lesions at the earliest possible stage when chance of cure is the greatest.

SUMMARY

1. Abdominal pain is the most common symptom and the most common first symptom in carcinoma of the right colon.
2. This pain is on the basis of obstruction.
3. In approximately 66 per cent of cases, a palpable mass is present when the patient presents himself to the physician.
4. Anemia is common finding (60 per cent).
5. Occult blood will be found by the Benzidine test in nearly 100 per cent of cases far enough advanced to give symptoms.
6. Any patient with secondary anemia should be studied for the source of blood loss.

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An emergency might arise in which a surgeon on the frontier might be called upon alone to operate for strangulated hernia, his inexperience and lack of assistance might result in a fatal mishap to the sufferer. In such a case the law would not hold this surgeon to so strict accountability, providing he exercised ordinary skill and attention, as it would a surgeon of eminence and experience. What would be interpreted ordinary skill in the former would be counted ignorance in the latter. But if the inexperienced surgeon gave his patient to understand that his skill was amply sufficient for all contingencies, and did not avail himself of practicable assistance, then his contract would have been a *special one,* and he could be held accountable for his ignorance. This latter course the rightminded and intelligent physician never will pursue, nor should it ever be pursued. He who claims extraordinary skill must perform extraordinary labor.

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Treatment of Carcinoma of Right Colon

Review of Twenty-one Casses

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A review of the management of twenty-one cases of histologically proven malignancy of the right half of the colon seen at the Fargo Clinic during the past five years leads to three observations worthy of note. First, it is felt that there is need to emphasize that obstructing lesions occur in the right side of the colon more frequently than is generally supposed and that colonic obstruction due to a right colon neoplasm is, in our experience, a hazardous situation demanding close observation and often emergency measures. Second, multiple colonic lesions are rather frequent. In order to decide on the best operative approach to multiple lesions, they must first be discovered by means of careful and complete colon study, including barium enema, proctoscopic examination, and careful palpation at the time of surgery. Finally, the satisfactory results of the one-stage hemicolectomy and ileo-transverse colostomy suggest that this is the operation of choice in most cases.

REVIEW OF TREATMENT

Nineteen of the twenty-one cases reviewed were treated surgically. Two patients with complete obstruction expired before surgical management could be administered. These will be discussed later.

Palliative operations. Three of the nineteen patients who were operated upon had surgery which was strictly palliative because of distant, irremovable metastases. Two of the palliative operations were one-stage right colectomy and open ileo-transverse colostomy. The other palliative procedure was a side-to-side ileo-transverse colostomy without resection.

Curative procedures. In the remaining sixteen cases, there remained a possibility of cure, even though a number of these had spread by direct extension into neighboring tissues. Of these sixteen patients fourteen had a single stage right colectomy and ileo-transverse colostomy. One of the fourteen, a patient with a malignant lymphoma, had postoperative x-ray therapy in addition. One patient underwent excision of the transverse and right colon because of extension of the cancer into the region of the middle colic artery, necessitating its sacrifice. One patient had a subtotal resection of the colon down to the rectosigmoid with closed end-to-end ileosigmoidostomy for two carcinomas, one of which was located in the sigmoid colon.

Type of anastomosis. A closed or aseptic type of anastomosis was performed in twelve of the sixteen. Open anastomosis was done in the remaining four. End-to-end restoration of bowel continuity was accomplished in ten, end-to-side in five, and side-to-side in one.

Incision. A transverse type of incision was used in ten cases, right rectus vertical incision in five, and left paramedian in one (subtotal colectomy).

Pathology. Seventeen of the twenty-one lesions were found to be adenocarcinomas. Two were reported to be undifferentiated carcinoma. There was one small cell carcinoma, and one "malignant lymphoma, lymphoblastic type."

Lymph node involvement. The operating surgeon mentioned in the operative record that lymph nodes in the mesentery were enlarged in fifteen of eighteen patients. The pathologist discovered metastasis to regional nodes in twelve of eighteen.

Multiple lesions. Seven of the twenty-one patients had more than one lesion of the colon. Three had more than one cancer. Two of the patients with multiple cancers had more than one occurring simultaneously (synchronous multiple cancers) while one had cancers appearing at different times (metachronous). The remaining four patients with multiple lesions had benign polyps in addition to the right colon cancer.

Morbidity. Of the nineteen patients subjected to operation, eleven had no postoperative complications. Three had no complications other than diarrhea, and in these more than the usual amount of bowel had been sacrificed. One of these was subjected to right colectomy with removal of above five feet of ileum because of a

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placque on the ileum which was felt to be metastatic. One had right colectomy plus excision of the transverse colon because of necessary sacrifice of the middle colic artery. The third patient underwent a subtotal colectomy including the terminal ileum with ileo-sigmoidostomy. Diarrhea subsided in all but the latter. Wangensteen[1] has pointed out that persistent diarrhea is likely to result only when the terminal ileum is sacrificed when subtotal excision of the colon is done.

One patient had no immediate complications, but developed small bowel obstruction nine months postoperatively. At the second operation, this patient was found to have metastatic carcinoma of the small bowel and successful resection of this segment of bowel was performed. Immediate postoperative complications other than diarrhea were seen in only three patients. One had mild ileus and nosebleed. One had postoperative melena, thrombophlebitis and wound infection. One patient was thought to have a small, non-fatal pulmonary embolus.

There were no patients who showed evidence of intraperitoneal infection as the result of surgery. One patient had been operated upon elsewhere on the morning of admission because of a suspected appendicitis, and was found to have a perforated carcinoma of the cecum with peritonitis. This was resected later that day as a palliative procedure, even though there was a large mass in the left lobe of the liver. This patient had an uncomplicated postoperative course and was discharged from the hospital on the eleventh postoperative day.

Hospitalization period. The eighteen patients who survived had an average postoperative hospital period of thirteen days. Fourteen patients whose postoperative course presented no immediate complications had an average postoperative stay of ten days.

Mortality. There was one death in nineteen patients who underwent surgery, a surgical mortality of 5.3 per cent. This patient had a virtually completely obstructing lesion of the ascending colon with extensive peritoneal implants. Following a palliative ileo-transverse colostomy, he expired on the third postoperative day. The mortality was zero among patients without obstruction, but was 60 per cent for five patients with obstruction (including two who expired before coming to surgery).

The problem of obstruction. As previously mentioned, two patients with complete obstruction of the colon expired without coming to surgery. These two unfortunate individuals might have been saved had we been more alert to the dangers of obstruction.

CASE REPORTS

Case 1. A 55-year-old man was admitted with a history of recurrent bouts of crampy abdominal pain of two months' duration. He had been hospitalized elsewhere on three different occasions because of these pains. Examination on admission was essentially negative. A barium study of the colon was reported to reveal some question of a lesion in the ascending colon or cecum. A repeat colon study revealed an obstructing tumefactive lesion at or just proximal to the hepatic flexure. The patient was scheduled for colon resection some days later and put on oral antibiotics and a high protein liquid diet. Two days after the second colon examination he complained of abdominal pain during the night. The night nurse called the intern, who ordered medication for pain, but failed to see the patient. The staff surgeon was not notified. Upon seeing the patient next morning, it became immediately apparent that he was seriously ill. The pulse was rapid and thready. The blood pressure was not obtainable. The abdomen was moderately distended and generally tender. He was immediately taken to the operating room, where oxygen and whole blood were administered. The blood pressure failed to rise and the patient expired. Autopsy examination revealed a completely obstructing annular carcinoma of the ascending colon with marked distention of the cecum and distal small bowel. There was no bowel perforation or gross soiling of the peritoneal cavity.

Case 2. A 73-year-old housewife was admitted to the hospital at 12:30 a.m. She had been seen in the home because of lower abdominal pain of about one-half hour's duration. She had vomited once. No laboratory or x-ray studies had been ordered. About four hours after admission, she became suddenly acutely ill. When seen at this time, the pulse and blood pressure were not obtainable. She expired five and one-half hours after admission. Autopsy revealed an annular completely obstructing adenocarcinoma of the hepatic flexure of the colon with perforation of the cecum and gross soiling of the peritoneal cavity.

These two case reports illustrate the need for alertness in the diagnosis and management of patients with carcinoma of the right colon. Had the surgeon been notified in the first case, it is possible that emergency decompressive surgery may have saved this patient. In the second case, an emergency scout film of the abdomen may have provided sufficient information to lead to the correct diagnosis and emergency decompression. It was even more discouraging to find at autopsy that neither of these patients had distant metastases.

Five of twenty-one, or 24 per cent, of the patients in this series showed evidence of practically complete obstruction, with marked distention or perforation of the bowel proximal to the lesion. The three patients who expired have already been discussed. The two who survived were both treated preoperatively with Miller-

Abbott suction followed by primary right colectomy and closed end-to-end ileo-transverse colostomy. Both had incompetent ileo-cecal valves with large and small bowel distention.

The obstructed patient whose ileo-cecal valve is incompetent may, we believe, be given a short trial on suction followed by early primary one-stage resection. They must, however, be followed with great care. The obstructed patient whose valve is competent and whose cecum is distended requires emergency decompression. Wangensteen and others have pointed out that the ileo-cecal valve, when competent, establishes a closed-loop obstruction. The danger of perforation of the cecum is considerably greater when the valve is competent, since sustained and increasing pressure results in gangrene and necrosis of the bowel wall. With perforation of the obstructed colon, death is almost certain. The surgeon has a choice of several decompressive operations. Cecostomy, appendicostomy or catheter ileostomy with insertion of the catheter through the ileo-cecal valve will afford sufficient decompression to prevent rupture of the bowel. In all five of our obstructed patients, the ileo-cecal valve was incompetent. Nevertheless, it is felt in the light of these experiences that obstruction of the right colon must be regarded as a surgical emergency regardless of the status of the ileo-cecal valve.

The problem of multiple lesions. Seven (33 per cent) of our patients had more than one colonic lesion. Three (14 per cent) had more than one cancer of the colon; the remaining four had one or more benign polyps. In view of this high incidence of multiple lesions, the diagnosis of carcinoma (or polyp) of any portion of the colon demands a complete examination of the entire colon and rectum. The surgeon requires this information to determine the approach required to give the patient the best chance of cure with the least risk. There are three methods of diagnosis available: (1) palpation at the time of laparotomy, (2) barium study of the colon, and (3) proctosigmoidoscopy.

The radiologist is correctly reluctant to force barium beyond any partially obstructing lesion of the colon. Hence, the surgeon needs to be acutely aware of the high incidence of multiple lesions and must carefully palpate the proximal colon in order not to miss a second lesion. One of our patients was admitted with an adenocarcinoma of the lower sigmoid colon. Diagnosis had been established by means of barium enema and proctoscopic biopsy, but the remainder of the colon was not studied because of the partially obstructing nature of this lesion. Careful palpation of the proximal colon at the time of resection of the sigmoid colon cancer failed to reveal a second lesion of the hepatic flexure. Although small, this second lesion was most likely present at the time of the first operation, since it was discovered by barium enema only three months later.

Proctosigmoidoscopic examination should be done before surgery on every patient with an x-ray diagnosis of cancer of the right colon. The information afforded by this examination may determine the best approach. In one patient with a carcinoma of the hepatic flexure, proctoscopic removal of a single, fairly large polyp of the sigmoid colon was possible. When serial sections proved this lesion to be completely benign, it was felt safe to perform a right colectomy.

The one-stage hemicolectomy. Curative gastrointestinal cancer surgery requires not only wide removal of the cancer-bearing area, but also removal of as much of the lymphatic drainage area as possible. In order to accomplish these two objectives, the right colon and terminal 15 to 20 centimeters or more of ileum must be sacrificed. It is necessary to remove this much bowel because its blood supply is sacrificed in the removal of the lymphatic-bearing mesocolon.

Although all authorities agree that this goal must be reached, all do not agree as to the best method of reaching it. Exteriorization operations have been largely abandoned. Lahey favors a modified Mickulicz plan requiring later closure of a spur colostomy. Most surgeons are coming to favor the one-stage hemicolectomy with ileo-transverse primary anastomosis. In very poor risk patients, however, or in patients whose lesion presents inflammatory changes making resection hazardous, a two-stage procedure may be indicated. A primary ileo-transverse anastomosis is done at the first operation. After a suitable waiting period, the right colon may be resected with less danger and with greater ease. Occasionally, a fixed, apparently non-resectable lesion may become removable.

The advantages of the one-stage primary operation are readily apparent. Avoidance of the extremely irritating discharges from the ileum on the skin of the abdominal wall is highly desirable. There is great danger of recurrence of carcinoma in the abdominal wall following exteriorization procedures. Finally, one operation is to be preferred to two if it can be safely accomplished. Person and O'Neill[2] in an excellent

(Continued on page 502)

The Incidence of Diabetes Mellitus and Glycosuria in 19,358 College Students*

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During the past four years a total of 19,358 patients have been examined at the University of Minnesota Health Service, during which time routine urinalyses were performed. Since these were entrance physical examinations there was no repetition of patients. Any person showing any quantity of sugar in his urine was called back for further examination, including a two and one half hour glucose tolerance test, consisting of the ingestion of 100 grams of glucose. The patient was then interviewed and this information, together with the results of the tolerance curve, established a diagnosis. As a result of the rather marked number of renal glycosurics that were found in this series, a summary of the findings and statistics was stimulated and a perusal of the literature was undertaken.

Because of the copious number of articles regarding diabetes mellitus and glycosuria it was difficult to find many for comparative purposes, but an effort was made to study the large series of glycosurics. Studies by Joslin, Marks, Watson, Sevringhouse, and the like, gave little chance for comparison but did stimulate some observations which will be discussed later in the paper. However, two recent studies in glycosuria and diabetes mellitus on selectees and inductees were found which fell into the same realm as our study here at the University of Minnesota. In Blotner's series of 45,650 selectees at the Boston Induction Station, the percentage of glycosurics found was identical to those found in our studies, but the percentage of diabetics was greater. Spellburg and Leff studied 32,033 selectees in the New Orleans Induction Station but their figures were found to be less than those determined here. There is a good place for comparison, however, for their studies included individuals from 18 to 37, which is very close to ours of 14 to 37 in glycosurics with the concentration from 17 to 27. The group of patients studied at the University of Minnesota were primarily college students of academic age, but in addition, University High School students and graduate students were included. It was previously stated the age span was similar to that of inductees. The male to female population ratio was about two to one through the period of years examined—1948 to 1952—and the glucose tolerance test as already mentioned was the two and one half hour variety.

One factor which altered some of the blood sugar levels was that of a change to the use of a photo-electric colorimeter about midway through the series. The variation was nominal, however. Of the 19,358 patients examined there were 155 glycosurics, or about 80 cases per 10,000. This is identical with that found by Blotner. At the same time, 70 cases of diabetes were found, which is 36 per 10,000 population, but was 45 per cent of the total glycosurics as contrasted with 57 per cent as indicated by Blotner. In addition, the renal glycosurics totalled 32 in number which would be 16 cases per 10,000. There were 47 cases of glycosuria with a normal curve and no renal evidence, which we classed as normal variance. These were 24 per 10,000. In addition, there were six cases of what has been termed "temporary hyperglycemic glycosuria" in which the fasting blood sugar was normal, the blood sugar peak high, but the return to normal of the curve was definite in an hour and a half. These we shall discuss further. There were three per 10,000 in this instance (see table I).

The question of diagnosis in glycosuric cases which are not diabetes mellitus is difficult. There are several thoughts in this regard as indicated by standard texts such as Christian, Cecil, and Harrison. I take odds with the statement that true renal glycosuria need have glycosuria at all times. In our series of cases the thirty-two individuals who have *normal* glucose tolerance curves, including a distribution peak of 140 milligrams per cent and a fasting sugar

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TABLE I

Distribution of Series

Total examined = 19,358

	Total Cases	Cases per 10,000	Male	Female
Diabetics	70	36	48	22
Renal glycosurics	32	16	30	2
Temporary hyperglycemic glycosuria	6	3	6	0
Normal .	47	24	39	8
Total	155	80	123	32

well under 90 milligrams per cent certainly cannot have the glycosuria that occurs in a tolerance test explained on the basis of islet cell dysfunction. It is granted that there are other explanations for melituria such as liver disease, other carbohydrates (e.g. pentose or fructose) altered absorption, etc. To the best of our ability we ruled out these last possibilities. The remaining category which requires explanation is that which we have termed arbitrarily "temporary hyperglycemic glycosuria." In these cases the fasting sugar was normal as was the return of the curve; however, the peak was high (180 to 220 milligrams per cent). These people showed no signs nor symptoms and repeated yearly curves presented no essential change (one to four years). This proves still further that the mechanism of carbohydrate metabolism is highly complicated, but a simple explanation would be that of a slow, though adequate, islet cell response. These factors are to be discussed in another report.

Thus the series includes diabetes mellitus, renal glycosuria, "temporary hyperglycemic glycosuria," and transient glycosuria in which the tolerance curve is entirely normal. It may be noted that these individuals often had preceded their entrance examination with high carbohydrate meals such as pancakes and syrup, malted milks, candy bars.

Of the diabetics, 48 were male and 22 female, which was about the ratio of male to female in the University at that time. Of the renal glycosurics there were 30 male and 2 female, which makes a marked predominance of the male side, and of the "temporary hyperglycemic glycosurics" 6 were male and none female. Of the individuals diagnosed as normal following a glucose tolerance curve, 39 were male and 8 female, which again shows a discrepancy on the male side. Some years ago Joslin questioned whether diabetes increased as the result of a sedentary life. In checking those with diabetes, we found that the country-city ratio was the same as that of the university registration.

Because a definite family history of diabetes has been noted so many times, this was checked still further to ascertain whether diabetes was on one side of the family, on both sides, or none known, taking into account that family history is a hazy affair and that some individuals may have died accidentally early in life who might later have developed diabetes (see table II).

TABLE II

Incidence of Diabetes and Renal Glycosuria

	Family History Diabetes			Family History Renal Glycosuria
	One side	Both sides	None	
Diabetics	28	5	37	1
Renal glycosurics	8	0	21	3
Temporary hyperglycemic glycosuria .	2	0	4	0
Normal	10	0	37	0

However, the results were as follows: Of the diabetics, 28 of the 70 had diabetes on one side of their family, and 5 on both sides—a total of 33—as compared with 37 in which there was no history noted. Interestingly enough, there was one who had a definite family history of renal glycosuria. Of the renal glycosurics, there was diabetes on one side in 8 cases, on both sides in none, and in 21 cases there was no history whatsoever. In addition, there was a family history of renal glycosuria in 3 cases of the renal glycosuria, all coming from one family, all of whom had been studied regularly. Of the so-called "temporary hyperglycemic glycosurics" there was diabetes in 2 on one side of the family, on both sides none, and in 4 there was no history. In the normal, of the 47 examined there was diabetes on one side of the family in 10 cases, both sides in no cases, and in 37 instances no history whatsoever. Also, there was no family history of renal glycosuria. Of course, one cannot be certain in discussing the possibilities and probabilities with the patient, just what the family history is going to indicate. Among the 155 cases noted, there was a definite tendency to a positive history in the diabetics, with some suggestion in all cases of glycosuria, but this was not so dominant as anticipated.

As has been noted time and again, the weight factor enters into diabetes and for this reason the standard of plus or minus 10 per cent of normal weight was chosen and individuals falling outside of these figures were arbitrarily called underweight or overweight (see table III). Interestingly enough, in the diabetics, 17 of the males were normal weight, and 28 were underweight, therefore a total of 45 of the 48 male diabetics were of normal weight or less.

TABLE III
Distribution According to Weight

	Normal		Underweight		Overweight	
	Male	Female	Male	Female	Male	Female
Diabetics	17	6	28	2	3	14
Renal glycosurics	16	1	11	1	3	0
Temporary hyperglycemic glycosuria	4	0	1	0	1	0
Normal	22	3	13	1	4	4

At the same time there were 6 females who were normal and 2 who were underweight, a total of 8 of the 22 females. All of this occurred in light of the fact that the males were in a 2 to 1 ratio over females in the university population. Of the renal glycosurics there were 3 males who were overweight, but the remaining 29 individuals were normal weight or underweight. In the "temporary hyperglycemic glycosurics," all of whom were males, there was one overweight. In the normal individuals who had shown sugar, there were but 8, 4 males and 4 females, who were overweight. The rest of the summary of the weight factor, even in view of directed diabetes mellitus, was that there were few people who were overweight. Those who were overweight were predominantly female. Otherwise the relative ratio of diabetes mellitus, renal glycosuria, "temporary glycocemic glycosuria," and normal was about the same.

It was felt that it would be interesting to check the range of blood pressure together with the average, in each of the four types of cases. For comparison's sake, see table IV. In the diabetics, there were 2 which were abnormal, the highest being 146/98 and in the renal glycosuric there was 1 which was abnormal, the highest being 142/90. The determination of normal here was that of the systolic upper limit being 140, the diastolic upper limit being 90. Insofar as the average was concerned, there was no statistical variation between diabetics, renal glycosurics, temporary hyperglycemic glycosurics, or normals; and there were but 3 which were abnormal, 2 of which were in the diabetic group.

TABLE IV
Distribution According to Blood Pressure

	Range	Average	Abnormal
Diabetics	116/64–146/98	122/78	2
Renal glycosurics	108/60–142/90	118/70	1
Temporary hyperglycemic glycosuria	104/62–128/78	120/72	0
Normal	100/64–132/80	116/72	0

Checking the fasting blood sugars, the diabetics of course were high when not in control (see table V), but a comparison of renal glycosurics, temporary hyperglycemic glycosurics, and normals was observed. The renal glycosurics have a range from 72 to 100, with an average of 81, and a median of 80. The temporary hyperglycemic glycosurics had a range of 84 to 102 with an average of 90 and a median of 86. The normals had a lower limit with an average of 84 and a median of 80. There was no statistical variation between any of the three groups. The glucose tolerance curve, whenever it was found to be abnormal, was repeated and, as was suggested by Spellburg and Leff, there were occasions in which the followup tolerance curve was normal. In the temporary hyperglycemic glyosurics the curve was any peak over 160 with a return to normal, and in the renal glycosurics the curve was with a peak under 160 with a return to normal together with sugar in the urine (figure 1). As was mentioned earlier, this summary will be reported in another paper.

TABLE V
Distribution According to Fasting Blood Sugar

	Range	Average	Median
Diabetics	High	High	High
Renal glycosurics	72–100	81	80
Temporary hyperglycemic glycosuria	84–102	90	86
Normal	69–105	84	80

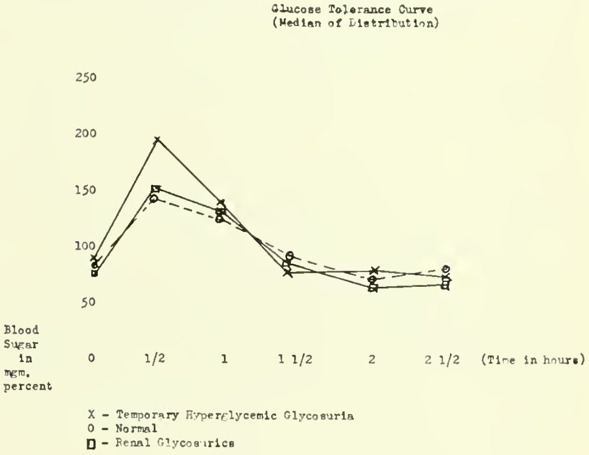

Fig. 1. Glucose tolerance curve.

SUMMARY

A survey of glycosurics in the examination of 19,358 patients of the young adult group is presented. The total is high as compared with Spellburg and Leff, and Sydenstricker and Brittain, but it compares identically with that of Blotner. The male to female ratio in diabetes mellitus was approximately 2 to 1 which compared with the University population, whereas that in renal glycosurics, normal individuals who had shown glycosuria, and temporary hyperglycemic glyco-

(Continued on page 500)

General Theory of Pain

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PAIN is a frequent and most important symptom of disease, especially in acute and subacute maladies. It is an abnormal sensation, known to nearly everyone but difficult to define. The best definition at present might be: a pathological sensation felt mostly in one, sometimes in more regions of the body, usually localized on the surface, less frequently in the depth of the body; deep pain is very difficult to delineate properly. The subjective sensation is so unpleasant as to make the individual suffering from it restless and even unhappy. Pain varies greatly in quality and degree, and ranges from a slight discomfort to the highest degree of unbearable suffering, rarely associated with an agonizing and distressing feeling of anguish.

Pain is generally conceived as caused by a peripheral stimulus, conducted by somatic nerves and spinal cord to a central reception and perceiving station, the precentral gyri of the cerebral hemispheres. Pain may be classified as follows:

I. With regard to origin
- A. Clinical (pathological) pain
    - 1. somatic: (a) organic, (b) functional
    - 2. psychosomatic
    - 3. psychic
    - 4. imaginary
    - 5. simulated
- B. Experimental pain

II. With regard to distribution
- 1. homotopic, confined more or less to the diseased parts
- 2. heterotopic, or referred pain, arising from (a) visceral, (b) muscular diseases
- 3. deep pain, from (a) viscus, (b) muscle (pressure pain).

Apart from the rare subcortical (thalamic) pain of unknown origin, it appears pertinent to distinguish the following five different *mechanisms* known to produce or be responsible for pain under clinical and experimental conditions.

1. Impaired blood circulation: coronary occlusion (thrombosis), angina pectoris, skeletal muscles contracting under ischemic conditions, such as tourniquet round a limb.

2. Prolonged and/or sustained contraction of striped or smooth muscles: tetanus, strychnine poisoning, intestinal and other visceral colics, etc.

3. Pressure from within a hollow visceral organ, such as stomach, intestine, gallbladder, renal pelvis, mostly experimentally produced.

4. Vascular pain: intermittent claudication, Raynaud's, Buerger's disease, etc.

5. Inflammatory pain.

If we consider that a sustained (tonic) contraction of some duration, without relaxation, of a muscle must lead to compression of its own blood vessels; that in inflammation, in spite of visible hyperemia, there is, as experimentally proved, a stagnation of the blood present by reason of pathologically dilated capillaries, it becomes apparent that the *common denominator* of all the mechanisms just mentioned is *diminished blood flow*, i.e., the quantity of blood passing through the unit of tissue per minute. The writer has therefore advanced the theory (1949) that diminished blood flow leading to an oxygen deficiency, relative to the momentary function of the tissue concerned, or local *hypoxia*, is *the cause of pain*, wherever it may occur.

FACTORS GOVERNING LOCAL BLOOD FLOW AND OXYGEN SUPPLY

Pain does not, as a rule, affect the whole organism, but is referred to one or more parts of the body. Hence general conditions such as anemia, hypohemoglobinemia, diminished oxygen tension, respiration, may be neglected here. For the questions of pain are relevant and decisive factors which govern the local circulation, determined mainly by the tonus of the small vessels, arterioles, capillaries and venules. The most significant factors are:

1. *Physical.* Local heat or cold.

2. *Physico-chemical.* The H-ion concentration —the pH—of the blood and tissue fluids. Slight changes to the acid or alkaline side of the normal $p\text{H}=7.33\text{-}7.42$ of the blood may be responsible for constriction or dilatation of the capillaries. For instance, in inflammation the local pH is acid, which dilates the vessels and aggravates the local hyperemia and stasis.

3. *Chemical.* Among these the most significant is the K:Ca ratio. The blood vessels, apart

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from the coronaries, are dilated by increased Ca or decreased K, but constricted by Ca deficiency or excess of K, as compared with the normal of 10 milligrams per cent Ca and approximately 20 milligrams per cent of K in the serum.

4. *Hormones, endocrines,* and some vitamins.

5. *Autonomic nerves.* They control the capillary tonus. Under pathologic conditions local vasoconstriction or local sympathicotonia, and local vasodilatation or parasympathicotonia are very often responsible for diseases and pain.

6. *Metabolites.* As far as known at present, lactic acid and adenyl phosphoric acid are dilators, but histamine constricts arterioles and dilates maximally capillaries.

From a clinical point of view the most important factor responsible for pain as a leading symptom of many, if not most diseases is the autonomic nervous system, especially an *imbalance* of the sympathetic and parasympathetic. The greatest rôle in the production of pain should, it appears, be attributed to the general and local hyperactivity of the sympathetic. About a hundred years ago the great French physiologist Claude Bernard (1852) established that the extirpation of the cervical ganglion leads to vasodilatation and increased sensitivity to pain in the corresponding side of the face. Francois-Franck (1878-79) proved experimentally that heart and aorta possess *centripetal* sympathetic fibers which have their relay in the stellate ganglion. The latter is capable of reflecting impulses received directly to the periphery, without requiring them to pass through the spinal cord. Stimulation of the stellate ganglion produces vasoconstriction of ear, submaxillary gland, nasal mucosa and *coronary vessels.* The reaction could be arrested by cocainization. Lastly, there is R. Leriche, who established that puncture or electric stimulation of the stellate ganglion elicits violent cardiac pain in subjects with a normal heart. He stressed that the vasoconstrictive distribution of the left stellate ganglion corresponds exactly to the distribution of pain in anginous attacks.

From lack of space I cannot quote the extensive literature regarding the question of sympathetic and pain. Suffice it to say, that there is overwhelming evidence for the conclusion, not sufficiently appreciated by physicians, that the sympathetic is frequently instrumental in producing pain in many diseases. The experimental findings of Sutton and Lueth, 1931, indicate that lack of oxygen is the only local mechanism responsible for cardiac pain. In keeping with this are observations of attacks of angina pectoris in patients suffering from severe anemia (lack of the oxygen carrier hemoglobin!). This is the explanation for the favorable results of neurosurgical operations on the sympathetic in many diseases associated with pain — gangliectomy, periarterial sympathectomy, paravertebral nerve block, etc.

MUSCLE AS ALGOGENIC ORGAN OR TISSUE

The analysis of the pain mechanisms leads to another remarkable conclusion. Since blood flow is mainly governed by the tonus, i.e., the caliber of arterioles, capillaries and venules, in other words the *contractile* elements like smooth muscle fibers in arterioles and venules, and the equivalent Rouget cells in the capillaries, the fact emerges that *mesodermic* tissue, either smooth muscles in the blood vessels or the muscle of myocardium and the skeleton is the main structure responsible for the production of pain.

HYPERPOTASSIA AND PAIN

It is known that Sir Thomas Lewis (1938) has postulated a P-factor (P for pain), which is responsible for pain arising from a skeletal muscle contracting under ischemic conditions, such as anoxia. According to this author the P-factor represents a stable metabolite occurring or produced in the interfibrillar muscular spaces under anoxia, which is rapidly washed away after restoration of the circulation. In the writer's opinion some physiologic and patho-physiologic data seem to indicate that an excess of K ions is identical with Lewis' factor. First, in muscular contraction K, contained in the fibers in a non-diffusible organic compound, leaves the muscle in a diffusible form in the surrounding tissue spaces. Second, it has recently been established (Fenn, 1941) that slowing of the blood flow in a muscle, even when of a moderate degree, leads to K ions leaving the muscle into the interfibrillary spaces. It is therefore obvious that muscular contraction under ischemic conditions must cause relatively large quantities of K being diffused outside the muscle fibers, which cannot be washed away; hence an accumulation of K in pathologic concentration must take place.

Third, it has been known (Ranke, 1868) that K is very poisonous to nervous tissues. It was further shown (Gruetzner, 1894, Loeb, 1902) that sensory nerves are very sensitive to an excess of potassium. It may be mentioned, in passing, that the normal oxygen consumption of tissue depends on the appropriate K:Ca ratio (see Hoeber, 1926); K excess diminishes the O_2 consumption of frog's heart (Arnoldi, 1924), and of sciatic nerve (Kaganovskaya and Shlykova, 1924). Thus, the contention seems justified that the *hyperpotassia*, induced by diminished blood flow and hypoxia is in the last resort responsible for pain, by stimulation of sensory cerebrospinal nerves.

THEORY OF REFERRED PAIN

Every student is familiar with the phenomenon of heterotopic pain occurring in many visceral diseases, acute or chronic. Only recently it was discovered that a muscle may behave like a viscus, in giving rise, when diseased, to referred pain. It was shown by the present writer (1938-1950) that rheumatic and other myalgias (myopathies) are characterized by heterotopic pain arising from socalled "myalgic spots," which are anatomically defined and capable of objective localization. On hundreds of cases it could be proved that the relation between a myalgic spot and the pain elicited by it is subject to the rule of dermatomes: both are innervated by the same spinal nerve or its neighboring roots. This approximate rule is helpful for the localization of the myalgic areas causing a given pain. The phenomenon of referred pain seemed for a long time difficult of explanation. Sir James Mackenzie was the first to state that it was caused by an "irritable focus" in the spinal cord. The theory implies that a diseased viscus elicits, by means of visceromotor and viscerosensory reflexes a hypersensitive area in the cord which registers normal sensory sensations or stimuli as painful. Another more recent explanation is "false localization," that is, pain arising from deep bodily structures is falsely projected by the patient to different superficial skin areas. However, the new theory of pain as due to local hypoxia enables us to account for the phenomenon in a more convincing way.

There is conclusive experimental evidence to show that there exist vasomotor and visceromotor axon reflexes, from sympathetic ganglia, and spinal reflexes which are responsible for changes in the caliber of the capillaries, contraction or relaxation of smooth muscles: faradic stimulation of a viscus produced a visible blanching of the skin in several segments of the cord (Wernoe, 1925, Speranskaya-Stepanova, 1925). The irritation was often accompanied by visceromotor reflexes of spinal origin. Conversely, stimulation of the skin elicited ischemia and contraction of a viscus, or alternately hyperemia and intestinal relaxation. The latter is due to a spinal reflex, the former to an axon reflex, independent of the cord. Clinically Wernoe (1936) observed that the hyperalgesic areas, associated with visceral diseases, were blanched and distinctly visible in subdued light. The anemic skin areas (zones) corresponded exactly to the zones of hyperalgesia (figure 1).

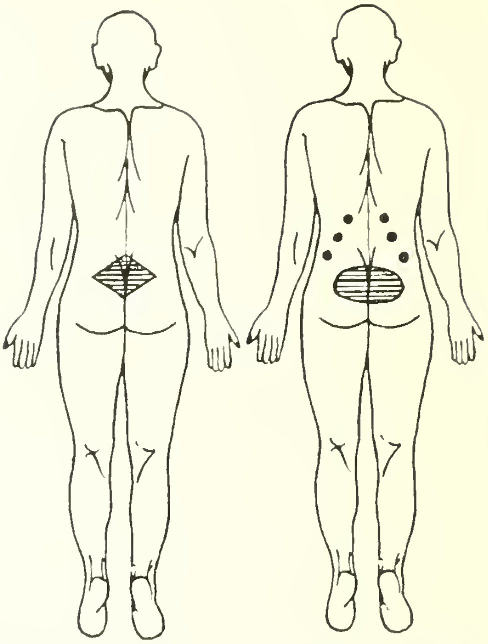

Fig. 1. (Left) Anemic zones in rectal diseases, corresponding exactly with area of hyperalgesia. (Right) Distribution of painful skin area, as mapped out by patients in lumbar myalgia. Dots—myalgic spots. Shaded areas—pain.

In view of this conclusive evidence there could, in my opinion, be no doubt that referred pain associated with visceral diseases is *locally* conditioned, and caused by vasomotor changes in the circulation of the painful skin areas. The conclusion is therefore justified that pathologic sympathetic axon reflexes leading to constriction of blood vessels are responsible for the phenomenon. The conception is in full harmony with the theory of pain propounded here.

It was mentioned above, that rheumatic myalgia is characterized by and associated with referred pain. Since it was proved experimentally (T. Lewis and coworkers, 1939) that a muscle, when irritated, behaves exactly like a viscus, the muscular pain phenomena are accordingly best accounted for by musculo-dermal vasomotor reflexes. Similarly the clinical observation (Good, 1940) that idiopathic myalgia may mimic visceral diseases has to be explained by pathological musculo-visceral reflexes, either leading to relaxation of smooth muscular layers and hyperemia in a visceral organ, probably of spinal origin, or the reverse, vasoconstriction and tonic contraction by axon reflex.

THEORY OF PROCAINE EFFECT

The new conception of the cause of pain and nature of referred pain seems to square well with the therapeutic results of Novocain treatment. It was Lemaire (1926) who first described that heterotopic pain caused by visceral diseases could be relieved by local anesthesia. This was confirmed by other authors (Weiss and Davies, 1928, Morley, 1929, Rudolf and Smith, 1930). But what is more surprising is the fact that by injections of small quantities of procaine accurately into the myalgic spots, all the pain, including referred pain, could be abolished, not only temporarily but apparently permanently (Good, 1940-1951). The amazing procaine effect can now be explained by interruption of a pathologic reflex-arc, responsible for vasoconstrictive pain. Under normal conditions the sympathetic is continuously sending impulses to the peripheral blood vessels which keep them in a slightly physiologic tonus, as evidenced by the fact that sympathectomy leads to vasodilatation and raised temperature in the corresponding skin areas. Thus procaine produces vasodilatation and relief of pain by removal of normal and pathologic constrictive stimuli and reflexes. But why should the effect be permanent? An explanation appears possible on the basis of findings of Donaggio that an early primary degeneration occurs in nerve fibers in contact with an anesthetic solution. In such a way the pathologic reflex-arc is cut for a longer period.

In passing I should like to mention psychogenic pain; the diagnosis seems to have become very fashionable in English speaking countries. In the writer's opinion and experience psychogenic pain does not exist, unless it be simulated. Even when elicited or aggravated by psychological factors, the pain complained of is nonetheless real indeed and *somatically* conditioned by disturbed circulation and hypoxia in the painful areas.

Novocain formerly used for the prophylaxis of pain, enabling the surgeon to operate without causing agony to the conscious patient, can now be successfully used for curative purposes, to control pain permanently in rheumatic and other functional myopathies. This opens new hope for the treatment of some maladies the predominant symptom of which is pain, a group called by Leriche "disease of pain." I am possibly overoptimistic in expressing the opinion that it is not beyond the power of modern scientific medicine to devise means and ways of controlling permanently almost every kind of functional pain.

SUMMARY

The analysis of the phenomena of pain under pathologic and experimental conditions and the different mechanisms causing it shows that the common denominator is diminished blood flow in the organs or tissues concerned. The hypohemorrhoea leads rapidly to a relative oxygen deficiency, hypoxia. The theory is advanced that hypoxia, diminished oxygen supply relative to the momentary function of the tissue, is the cause of pain, wherever it may occur and of whatever cause. Pain is a local more or less circumscribed phenomenon. In contradistinction to the general, the local blood and oxygen supply depend mainly on the tonus of the small blood vessels, which to a large extent is governed by autonomic-vegetative nerves. Evidence is adduced to show that a locally hyperactive sympathetic — local sympathicotonia — in leading to vasoconstriction and hypoxia, is in the majority of cases responsible for pain. There seems to be conclusive evidence in support of this view.

Referred pain, known as the hallmark of visceral diseases, has recently been proved to be common in functional muscular maladies—rheumatic, traumatic and idiopathic myalgias, which probably have a functional pathology such as myasthenia gravis. In the light of clinical and experimental observations, briefly discussed, referred pain and associated phenomena are brought about by pathologic reflexes, that is, viscero-cutaneous vasomotor and viscero-muscular axon or spinal reflexes. In a similar way, the heterotopic pain recently found characteristic of functional myopathies is accounted for by pathologic musculo-dermal and musculo-visceral reflexes. The remarkable curative effect of Novocain injection is probably due to the interruption of a morbid reflex-arc, vasomotor sympathetic axon reflex, or of a spinal reflex.

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(Continued on page 501)

Lancet CLINICAL REVIEWS

This department of The Journal-Lancet *is devoted to reports on cases in which all the appropriate diagnostic criteria have been employed, the best known treatment administered and the results recorded. It is desired that these case reports be so prepared that they may be read with profit by physicians in general practice, hospital residents and interns and may be of considerable value to junior and senior students of medicine. This department welcomes such reports from individuals or groups of physicians who have suitable cases which they desire to present.*

Testicular Tumors*

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C. D. CREEVY, M.D. AND
R. W. KRUMBACH, M.D.

Mr. O. R., age 48, University Hospitals No. 817962, was admitted April 21, 1950. Two years before admission he noticed a painless swelling of his left testicle which almost completely disappeared in a few weeks and then recurred about Christmas of 1949. When seen in the out-patient clinic he complained of "gnawing" pain in the abdomen which radiated to his back and had been constant since January of 1950. For the past 15 years he had episodes of weakness and "cold sweats" associated with nausea and vomiting and occurring once or twice a year. More recently the nausea and vomiting had occurred three to four times a week and had been relieved by frequent small feedings. He had noticed no recent loss of weight, change in bowel habits, nor melena. Roentgenograms of the gastrointestinal tract done elsewhere one year ago revealed a "nervous stomach." In 1941 he had bilateral iridectomies because of glaucoma.

Physical examination on admission, in April, revealed a well developed, well nourished, white male who exhibited no signs of acute distress. Blood pressure was 105/75, pulse was 84, and respirations were 14. He had bilateral iridectomies, glaucomatous cupping and marked atrophy of the optic discs. Heart and lungs were negative to auscultation and percussion. The left testicle was about one and one-half times normal size and the inferior pole was very firm.

Hemoglobin was 13.2 grams, leucocyte count was 8,050, with neutrophils 79 per cent, lymphocytes 19 per cent, and monocytes 2 per cent. The sedimentation rate was 91 millimeters in 60 minutes. Examination of the peripheral blood smear excluded lymphoblastoma. No abnormalities were noted in the urine analysis. Roentgenograms of the gastrointestinal tract revealed no intrinsic disease, though the distal transverse colon was displaced downward by a retroperitoneal mass just to the left of the spine. X-ray film of the chest revealed no pulmonary metastases. Because the excretory urogram was of poor quality, cystoscopy and retrograde pyeloureterograms were done. These revealed some residual barium in the bowel and appendix, a normal right kidney and ureter and a lateral displacement of the upper left ureter by an extrinsic mass (figure 1).

On April 25, 1950 the left testicle was removed through an inguinal incision; the structures of the spermatic cord were clamped at the internal inguinal ring and severed by diathermy. The postoperative course was uneventful. The pathologist's report was seminoma of the testis. High voltage roentgen irradiation was given to the periaortic and left inguinal

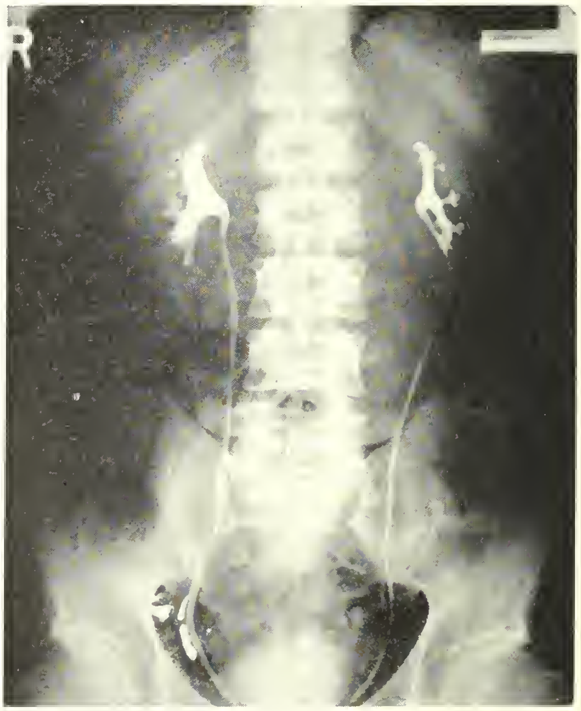

Fig. 1. Bilateral pyelograms. The upper part of the left ureter is displaced laterally.

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regions. Aside from a mild irradiation sickness associated with nausea, his postoperative course was uneventful.

On December 30, 1950, he was readmitted to the University Hospitals for the removal of a lump in his left breast. This was reported by the pathologist as fibrous mastitis. There was no evidence of recurrence of the testicular tumor on this admission.

In September 1951, examination revealed no evidence of recurrence of the neoplasm. The retroperitoneal mass which disappeared following irradiation could not be palpated, roentgenograms of the abdomen and chest were negative for metastases, and an aortogram, while of poor quality, did not demonstrate any tumor. He had gained 25 pounds since April 1950. The skin of the abdomen was pigmented following irradiation.

DISCUSSION

About 1 to 2 per cent of all neoplasms occurring in males involve the testicles. The occurrence of these tumors in the ectopic testicle has been reported as 48 times higher than is expected by chance. Orchiopexy does not decrease the incidence but rather serves to make the organ accessible for examination. About 1 per cent of individuals with a tumor in a descended testicle will develop a neoplasm in the other one; whereas in bilateral cryptorchidism the incidence of a second neoplasm developing in the other testicle is 24 times as frequent as occurs in descended testicles. Testicular tumors occur most often in the second to the fourth decade of life but also have been reported in the first and as late as the seventh decade. The right gonad is involved slightly more frequently than the left. About 95 per cent of all testicular tumors are considered malignant as compared to 60 per cent of tumors involving the epididymis.

The varied histological pattern of these neoplasms has resulted in numerous confusing terminologies. Simply, they may be classified as: one, seminoma; two, embryonal carcinoma; three, chorio-epithelioma; four, teratoma; five, any combination of the above four; six, sertoli cell; seven, interstitial cell; and eight, metastatic. The seminoma grows slowly and metastasizes late via the lymphatics. The embryonal carcinoma grows rapidly with early involvement of the retroperitoneal lymph nodes. The adult teratoma does not usually metastasize early; whereas the chorioepithelioma is invariably fatal because of early and rapid dissemination of the tumor primarily by the blood stream. The periaortic lymph nodes, extending from the bifurcation of the aorta to above the renal pedicle, are the most common sites of metastasis. Occasionally the left subclavian lymph nodes are involved. Invasion of the inguinal nodes occurs only with retrograde dissemination or invasion of the scrotum. Often there are pulmonary and hepatic metastases.

Despite the accessibility of this organ for examination by the patient and the physician, in most large series of testicular neoplasms at least 60 per cent had metastases when first examined. Diagnosis is rarely difficult. Usually there is a history of a testicular enlargement, painless and gradual, though infrequently the onset is explosive and painful in nature. Occasionally the only complaint may be an ache in the scrotal region or the groin. Interstitial cell tumors in children may produce precocious puberty, and in adults gynecomastia and loss of libido. Neoplasms containing chorionic elements also produce gynecomastia. Sometimes, however, signs and symptoms referable to the pulmonary and retroperitoneal metastases bring the patient to his physician. Excretory urography with delineation of the ureters is a valuable adjunct in determining the presence of metastases (figure 1). Pulmonary lesions can be demonstrated by roentgenograms. The sedimentation rate is usually elevated. Hydroceles should be aspirated before attempting to examine the testicle. The presence of chorionic gonadotropin in the urine is a valuable diagnostic aid but its absence does not exclude neoplasm. For obvious reasons aspiration biopsy or exploration and biopsy should not be done; it is less hazardous for the patient to ligate the vessels of the spermatic cord before manipulating the testicle. An x-ray film of the scrotum is valuable only in differentiating a calcified hematoma of the tunica vaginalis or a calcified hydrocele. Varicocele and hernia can be readily differentiated.

Dr. Lloyd Lewis who has had the greatest individual experience with neoplasms of the testicle advocates the following therapy; simple orchiectomy for the benign tumors; orchiectomy and x-ray irradiation for the seminomas; radical orchiectomy for the adult teratoma; and radical orchiectomy and irradiation for all other types of testicular neoplasms. The removal of the external and common iliac lymph nodes as well as the periaortic lymph nodes can be a formidable undertaking and probably should not be done in the presence of known pulmonary or hepatic metastases. Under such circumstances simple orchiectomy and irradiation is the treatment of choice. Of all testicular neoplasms the seminomas are the most radiosensitive. Lewis reports his five year survival as: seminoma 84 per cent, adult teratoma 75 per cent, embryonal carcinoma 65 per cent, and choriocarcinoma 15 per cent.

This is the eleventh in a series of letters to Dr. J. A. Myers and the readers of the Journal-Lancet *from Dr. Ancel Keys, director of the laboratory of physiological hygiene at the University of Minnesota, during a year of study and travel abroad. Other letters will follow until Dr. Keys' return to the university.*

Notes from a Medical Journey

20 July 1952
Oxford, England

Dear Jay:

As expected, we did lose a lot of sleep in Holland and we are still tired back here in England. Not only our Dutch friends conspired to keep us up late of nights in Amsterdam. We had the pleasure, and all that goes with it, including fatigue, of foregathering there with some of my hosts and research collaborators of the past months -- Gino Bergami and Flaminio Fidanza of Naples, Hugh Sinclair and Bryan Lloyd of Oxford, Francisco Vivanco and Rodriguez Minon of Madrid, A. P. Meickeljohn of Edinburgh, and J. Tremolieres of Paris. Two international congresses were going on at the same time -- Diabetes and Dietetics -- and several of us, including Charlie Best of Toronto and Tremolieres, addressed the combined Congresses.

My address, "The Cholesterol Problem," was well received; too well, in fact, because the Dutch want to publish it in full and are demanding a manuscript. I am going to swear off lectures unless I can get sponsors to promise, in writing beforehand, that they will not ask for manuscripts for publication. A lecture prepared for oral delivery, even if written out in full, is by no means ready for the printers. Besides rewriting, there is all the tiresome business of providing references, as well as tables and figures -- which are not the same as slides. It is not only Amsterdam that bothers me now; I have not yet complied with the demands for the mss. of four lectures I gave in Edinburgh and London!

I had expected to do quite a bit of writing in Madrid but our supply of human subjects was too good and the laboratory results too interesting. We had to take advantage of an unusual opportunity, even though it meant attempting twice as much work as anticipated. The last days in Madrid were pretty frantic and it was no help to have the long-delayed summer heat finally arrive. We should have put in another week of work but time ran out and anyway the cholesterol method is impossible when the air temperature gets up around 100 degrees, with the ether boiling away and the color reaction lasting only five minutes instead of twenty. So off we went in a lather of perspiration, with a bag full of notebooks and half-calculated data, my Amsterdam speech unfinished and the Hillman clattering with two broken shock absorbers and a loose exhaust pipe. By driving hard we managed to save a day and a half for Santillana del Mar where the speech was finished in the balmy air of the Asturian mountain seacoast.

Here in England the children are excitedly immersed in the final events of the school year -- examinations, sports and all sorts of competitions, from declamation to swimming. Henry is now "third equals" (meaning tied for third place) in his form at New College School and Caroline won the swimming cup for girls under fourteen at Headington School. I take my hat off to the English schools. Somehow they manage to get the youngsters to make a real effort in all their studies as well as in their games and sports. They work hard but enjoy life in an atmosphere of kindly but unbending discipline. I think consistency is the key to training children as it is in training dogs or horses; they don't mind conforming to rules if the rules are unchanging and strictly applied with no favoritism or caprice. And maybe adults are not much different.

At the end of this week we are all going off to Denmark and Sweden for a few weeks of vacation before it is time to sail for home at the end of August. No fixed schedule; we shall simply drive along and stop when we find places we like, preferably where there is good walking or swimming. Besides getting a rest and seeing some different country, I want to have some time to think. The active pursuit of new facts, the collection of data, the making of measurements -- these are great fun as well as providing the solid stuff from which real knowledge must be built. But they represent, or should in decent research, only the implementation and testing of ideas and from them should come better ideas to explain both the old facts and the new. Well, our intensive field work of the past six months has provided a good crop of new facts and it is time to think about the whole business.

I suppose the main points to be considered are these: (1) In Minnesota and other parts of the U. S., where the diet is abundant (or excessive!) and relatively luxurious (over 30 per cent of the calories from all kinds of fats), the serum cholesterol level tends to rise steadily from adolescence to late middle age (the fifties). Our work over here shows much the same for England. This is the situation where severe atherosclerosis is present in a large proportion of the older population and where coronary artery disease is increasingly the outstanding cause of disability and death among adults. (2) In southern Italy and in Spain, from adolescence to age 30 or 35 the age trend in the serum cholesterol level is similar to that of Minnesota so it seems that the habitual diet has no great effect over this age range. The diet in southern Italy is adequate in calories but low in all fats, the diet of the poor people in Madrid is low in both calories and fats, and the diet of the well-to-do people in Madrid is comparable to diets in the U. S. and in England, but in all of these groups the serum cholesterol behaves in very much the same way until a few years beyond the end of physical growth. (3) The well-to-do people in Madrid, as exemplified by the doctors and university men, conform to the Minnesota pattern of continued rise in the serum cholesterol into the fifties but in the poor Spaniards there is a marked tendency for the serum cholesterol to decline after the early or middle thirties. In the poor Neapolitans the serum cholesterol is more or less constant after the middle thirties. At age 30 the average serum cholesterol is similar in all groups in Minnesota, in England, in Italy and in Spain, but at age 50 only the Englishmen and the Madrid doctors are like the Minnesotans, the Neapolitans being some 25 mg. per 100 ml. lower while the poor Madrilenos are about 50 mg. lower. (4) The observed differences do not seem to be related to differences in climate or race. Physical activity cannot be ruled out entirely as a factor but analysis by occupational activity does not indicate that it is important. We are left with the diet which we have already shown to be important in short-term (up to a few months) controlled experiments. And the controlling elements in the diet seem to be total fats and calories, the fats being the more influential. (5) Finally, such information as we are able to get about morbidity and mortality -- and it is far from satisfactory -- seems to conform to our expectations from animal experiments and the experience with diabetes, with myxedema, with nephrosis, and with idiopathic hypercholesterolemia. In other words, the higher the average level of cholesterol in the serum, the earlier and the more severe is the atherosclerotic development.

There are many more details to be considered but this is the general picture. I think it is enough to demand a much larger research effort and even to warrant the beginnings of efforts in the direction of preventive medicine and public health. Of one thing I am very sure: this field work in Europe has shown both the value and the practicability of the comparative study of population groups in terms of physiological and biochemical characteristics. I shall have some strong arguments for the forthcoming conference (September 11-14, Chapel Hill) on "Needed Research in Health Care." This is to be a series of discussions, sponsored by the Rockefeller Foundation, to indicate the character of research programs basic to a sociological examination of the broad problem of medical care. There are to be three sections: "Social Physiology," "Social Epidemiology," and "Social Science Research on Health." I am to be chairman of the first section, though I am not entirely sure what it means; my interpretation is that it has to do with "physiological hygiene."

And so thoughts come back to the laboratories under the Stadium and all our good friends at home.

As ever,

Ancel Keys

Put off your imagination, as you put off your overcoat, when you enter the laboratory. But put it on again, as you put on your overcoat, when you leave.

– Claude Bernard

BOOK REVIEWS

★

The Specialties in General Practice, edited by Russell L. Cecil, M.D., 1951. Philadelphia: W. B. Saunders Company, 1951. 818 pages. $15.00.

This book is arranged on an excellent plan and with a well conceived purpose, but the execution is not equal to the plan, and the result is disappointing.

The preface reminds us that "there has been a trend lately toward bringing back the family doctor to his old established place in the practice of medicine," and continues that, "each chapter in the book has been written by a distinguished authority *especially for the use of the general practitioner.*" Fourteen distinguished professors of medicine in eleven American colleges of medicine have contributed the fourteen chapters on as many special fields.

This reader is left with the impression that these professors have found it very difficult to decide how much the general practitioner should be expected to have learned in their courses and how much he can wisely undertake in the treatment of diseases in the special fields. Some chapters are largely devoted to conditions which he sees and treats very frequently. For these, he needs the fuller material in the basic books which are, or should be, in the library of every general practitioner. Other chapters discuss conditions so far beyond his skill that he does not need to buy an expensive book to advise him to refer such patients to a specialist.

The chapter on psychiatry, by Drs. Douglas D. Bond and John M. Flumerfelt, of Western Reserve School of Medicine, is probably the most useful one in the book. It covers a field in which the growing interest and new methods of treatment cause many general practitioners to feel the need of current information which may not have been available during their undergraduate days. The material is admirably chosen, and the suggestions are both simple and practical.

To say that the book on a whole is disappointing is only to say that an average of 60 pages for each specialty does not give space enough for the information which a general practitioner must have immediately available to serve his needs day in and day out.

C. W. del P.

Heart Disease, Its Diagnosis and Treatment, by Emanuel Goldberger, M.D., 1951, Philadelphia: Lea & Febiger, 651 pages, 229 illustrations. $10.00.

The author of this volume is well known to everyone interested in heart disease for his outstanding work in the development of unipolar electrocardiography and his book on the subject. In the present volume, however, the bedside diagnosis and treatment of heart disease is stressed.

Full coverage is given also to the latest advances in the use of technical methods, such as electrokymography, ballistocardiography, angiocardiography, and catheterization of the heart. Latest advances in the treatment are also fully covered.

The book is written in clear and interesting style and should be a welcome addition to the library of both the general practioner and the specialist as a ready reference on the subject of heart disease. T.Z.

•

A Textbook of Pharmacology, by W. T. Salter, 1952. Philadelphia: W. B. Saunders Company. 1240 pages. $15.00.

This comprehensive volume is intended for students and for up-to-date practitioners of medicine. The material is presented in a pleasant and readable fashion. The book reflects the author's intimate knowledge of the problems that confront the practicing physician.

The scope of modern pharmacology is very great and must of necessity embrace many aspects of physiology and internal medicine. This is a comprehensive textbook and the author includes much that one would ordinarily expect to find only in a volume devoted to internal medicine. It is an enormous task for a single author to discuss authoritatively such a wide range of subject matter. Having accepted such a challenge, the author must accept criticism if he exhibits any uncertainty of knowledge even in specialized fields. There are some errors discernible in this text; errors in a textbook are not excusable for they remain too long with us.

The material is presented under four headings. The first, general principles of pharmacology, is concise and informative. Section two, drug action on physiological mechanisms, is extensive; both fundamental and clinical aspects of pharmacology are considered. Parts three and four include application of drugs in clinical medicine and toxicology.

There is a real need for an up-to-date textbook in the field of pharmacology; this volume fulfills that need and can accordingly be recommended to students and physicians.

• F.W.H.

Annual Report on Stress, by Hans Selye, 1951. Montreal, Canada: Acta, Inc. xxi + 511 pp. + 133 pp. of references. $10.00.

This is a sequel of the voluminous *Stress* by the same author (1950), "a treatise based on the concept of the general - adaptation syndrome and the diseases of adaptation." This and the subsequent annual reports were designed for a dual task: (1) that of a guide to the current literature, and (2) a systematization (critical correlation) of pertinent facts. The yearly yield of scientific production in this wide but relatively new field is large and is steadily increasing. A prompt digestion and integration of the new data should prove helpful, even though such a synthesis is undertaken within a conceptual framework which itself has been criticized.

The volume consists of three parts. The first deals with the general physiology and pathology of stress (present concept of "stress" and objections raised against it, definition of related terms, a survey of stressor agents such as trauma, hemorrhage, heat or cold and infection, and a synopsis of the pharmacology of "adaptive hormones," such as corticotrophin, cortisone, and adrenalin). The second part constitutes the bulk of the volume and deals with the special physiology and pathology of stress, from changes in basal metabolism under stress, through "joint diseases of adaptation" (such as rheumatoid arthritis) to wound-healing. The brief third part contains a sketch for a unified theory of medicine.

J.B.

American College Health Association News . . .

We are pleased to announce that the executive committee has approved the application for membership of Kentucky State College, Frankfort, Kentucky. Kentucky State College has an enrollment of 212 men and 266 women undergraduate students. Dr. James T. Ramsey is the director of the Student Health Service and William Exum is the health educator. Two full time nurses and one part-time dentist complete the health service staff.

* * *

Dr. James W. Halfhill and Dr. Jerry O. Christ have been serving as full time university physicians at Bowling Green State University hospital since September 1951. Both physicians are retired medical officers AUS, and they both served in the 37th Division before and during World War II.

* * *

Mrs. Opal Thorpe, R.N., has written the following summary:

"The Michigan College Health Association held its annual meeting in the Kellogg Center, Michigan State College, East Lansing, on May 23, 1952. Twenty-eight people were present representing fifteen schools of higher education in Michigan. Dr. M. L. Durfee, president of the American College Health Association, was a guest.

"The program included a report 'Summary of Survey on Tuberculosis Control Programs in Michigan Colleges' for the academic year 1950-51 by the chairman of the committee, Mrs. Marion Kelly, R.N., Jackson Junior College, Jackson. At the association luncheon, Dr. Irvin Sander of Wayne University gave a comprehensive review of the American College Health meeting in Boston, May 1, 2, and 3. Melbourne Murphy, University of Michigan, acted as chairman of the round table discussion of problems common to all health services. The problems discussed were (1) health committees—organization, personnel and functions, (2) psychological problems concerned with students and how handled, (3) health records—what is an essential record, how long should it be kept, who should have access to records?

"Officers elected for the year 1952-53 are: president, Miss Gayle Pond, R.N., Western Michigan, College of Education, Kalamazoo; vice-president, Mr. Charles Mobley, General Motors Institute, Flint, and secretary-treasurer, Mrs. Opal Thorpe, R. N., Central Michigan College of Education, Mt. Pleasant."

* * *

Dr. John W. Brown, professor of preventive medicine and director of the department of student health, has sent in the following report regarding the department of preventive medicine and student health of the University of Wisconsin:

"The department is an independent department of the Medical School, which is charged with the responsibility for the curriculum in the Medical School which has to do with preventive medicine, as well as a responsibility for the health services of the University of Wisconsin proper, in Madison." A large number of papers were printed by the members of the staff. There are at present twenty-two members on the professional staff for the year 1952-53.

Of particular note has been the acceptance of two members of the staff to positions at other universities as follows:

A. F. Rasmussen, M.D., Ph.D., who was a professor in the departments of medical microbiology and preventive medicine and student health of the University of Wisconsin Medical School, to professor of medical microbiology and chairman of that department at the University of California at Los Angeles.

Robert W. Quinn, M.D., associate professor of preventive medicine and chairman of that department at the Vanderbilt University School of Medicine.

Both Dr. Rasmussen and Dr. Quinn were members of the Central Society for Clinical Research. Dr. Rasmussen also became a member of the American Society for Clinical Research.

* * *

The members of the executive committee recently voted to contribute $40.00 to the National Midcentury Committee for Children and Youth. Mr. Leonard W. Mayo, chairman, acknowledged receipt of this contribution, saying "In addition to this financial encouragement, the continued interest and cooperation of your organization is indeed heartening to all of us who are striving to carry out this worthwhile and far-reaching program."

If the officers of each section will send the date and the meeting place of their section meeting to the secretary, the information will be announced in World Convention Dates. This journal is a clearing house for information on conventions, conferences, and expositions sponsored by all types of organizations. The Calendar of Coming Events is a useful guide in scheduling dates that will not conflict with other events.

* * *

DR. RALPH VINJE, formerly of Bismarck, has assumed new duties as medical director of the North Dakota workman's compensation commission. He succeeds Dr. William Henry Bodenstab who retired July 9. Dr. Vinje will also have a private practice in orthopedic surgery.

* * *

LAST YEAR Dr. Warren E. Forsythe, Director of the University of Michigan Health Service and his staff attempted to make some evaluations on comparative student health and the work of their department over a period of twenty years. The following data indicates an interesting change in the type of services rendered as well as differences in numbers of common conditions treated by their health service work.

INTERVAL COMPARISONS

Selected record rates which show significant changes in twenty-two years.

Rates per 1,000 Students — Regular Nine-month Session

	1929–30	1950–51
Allergy clinic visits	139	1,034
Dental clinic visits	91	467
X-ray examinations	255	502
Prescriptions filled in pharmacy	828	1,485
Laboratory visits	1,049	1,676
Mononucleosis (glandular fever)	1	14
Pneumonia	4	7
University Hospital admissions	23	11
Room calls	146	86
Dermatology visits	212	170
Refractions	130	73
Physiotherapy treatments (all)	842	384
Upper respiratory infections (all)	719	435
Acute appendicitis	10	5
Fractures	20	9
Constipation	25	3
Tonsillitis, acute	42	10
Otitis media, acute	8	2.5
Nose and throat operations at Health Service	25	3

* * *

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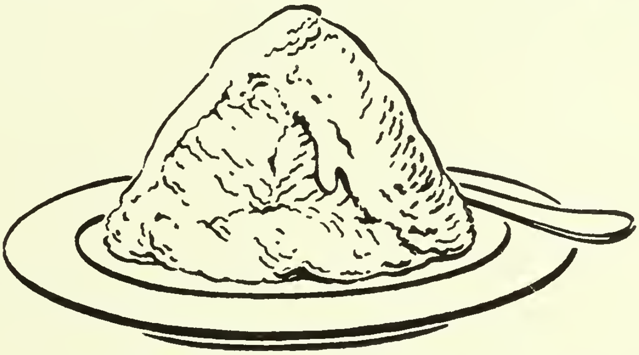

Comparable to ice cream in appearance, texture and flavor, Northland Diabetic Frozen Dessert contains sucaryl and non-toxic hexitols—mannitol and Sorbo—in place of ordinary sugar. It is intended for use only as directed by a physician. When so used, it adds appetizing variety to the diabetic diet. It is, of course, produced under strict laboratory supervision and rigid sanitary standards.

For technical information and references about hexitols and their value in the diabetic diet, write us or phone REgent 7211. . . . If you would like to try the new frozen dessert, we will gladly deliver a package to your home free of charge.

Northland Diabetic Frozen Dessert is now available to your patients, with your approval, at drug stores in Minneapolis and its suburbs.

FORMULA

(Percentage of solids content by weight)

Butterfat	17%
Other milk solids	5%
Mannitol	8%
Sorbo	8%
Edible gelatin	4/10%
Whole eggs (Egg solids 1¾%)	5%
Sucaryl	1/10%

CALORIC VALUE

One pint	625 calories
Average serving	160 calories

20% are slow absorbing carbohydrate calories
5% are protein calories
75% are fat calories

NORTHLAND

Diabetic Frozen Dessert

NORTHLAND MILK AND ICE CREAM CO., MINNEAPOLIS

THE COLLEGE HEALTH SERVICE at the Pennsylvania State College has just completed arrangements with the Pennsylvania Department of Health, Department of Tuberculosis Control, to x-ray the senior students in May of each year. Dr. Herbert Glenn, director of the college health service, believes this new program will be very desirable for the students leaving the campus.

* * *

THE OFFICERS AND EXECUTIVE COMMITTEE for 1952-1953 of the Ohio Section of the ACHA are as follows:

President—Dr. Max L. Durfee, Oberlin College; vice-president—Dr. Wm. T. Palchanis, Ohio State University; secretary-treasurer—Dr. Eleanora L. Schmidt, Ohio University.

Executive Committee: Dr. Charles L. Hudson, Western Reserve University Dr. W. S. Hawn, Marietta College; Dr. Carl Jenkins, Wilberforce University; Mrs. Mildred Crane, R.N., Otterbein College; Dr. T. Allenbach, Ohio State University, ex-officio, Dr. J. Roger Marquart, Wittenberg College (died May 24, 1952).

* * *

An educational program conducted by S. I. Fuenning, M.D., director of the student health service at the University of Nebraska, has borne fruit. The chancellor of the university has notified Dr. Fuenning that $100,000 has been presented to the Health Service for the purpose of conducting a mental health program on the campus.

* * *

Openings for physicians interested in college health work have been reported to us as follows:

Iowa State Teachers College, Cedar Falls, Iowa, will have a vacancy for a director and assistant director the start of the fall quarter, September 1. Anyone interested should contact Dr. Joseph H. Gamet, director of student health.

Eastern Illinois State College, Charleston, Illinois, has an opening for a college health physician who "must qualify for practice in the state of Illinois, but will do no private practice of any kind." This position offers a "professional opportunity for a man or woman interested in the educational phase of health service." For further information write to Robert G. Buzzard, president of Eastern Illinois State College.

Illinois State Normal University, Normal, Illinois, has an opening for a director of university health service. The initial salary on this position will be $7800 for twelve months with three weeks of vacation and certain other holiday periods. The position will have an excellent future and should develop into one that will pay $9000 on a twelve months basis. There are ten nurses attached to the health service with adequate secretarial help and new and high grade equipment in ample amount. There is a new and complete health service wing with a twenty-bed infirmary, adequate offices, laboratories, x-ray room and equipment, metabolism, therapy, and minor surgery quarters. If interested, contact R. W. Fairchild, president of Illinois State Normal University.

News Briefs . . .

North Dakota

THE FIRST MEDICAL-PRESS CONFERENCE in North Dakota was held in Fargo on Friday, September 26. Representatives of newspapers located east of a line drawn north and south of Jamestown were invited to attend, as well as any interested physicians in the area.

* * *

Two new x-ray machines, one for the diagnosis and the other for the treatment of cancer, have been installed at the Northwest Clinic in Minot. Funds for the purchase of the machines were made available under the terms of the will of Mr. and Mrs. Fred W. Strange of Minot, who died about a year ago. The clinic's cancer department has recently been remodeled for installation of the large machines.

* * *

THE MEDICAL CENTER of the University of North Dakota received $7,500 as its part of the $1,132,500 distributed to the 79 medical schools of the country by the American Medical Education Foundation. Four-year schools received $15,000, and two-year schools half of this amount.

* * *

ELEVEN AWARDS were presented to University of North Dakota medical students at ceremonies in August for work during the 1951-52 year. John B. Lunseth of Grand Forks received the Dr. Robert Campbell medical prize and the Grand Forks District Medical society prize. He also received prizes in physiology, pharmacology, bacteriology and parasitology.

The J. W. Colglazier memorial prize went to Walter H. Moran and John E. Leigh, both of Grand Forks, and Moran also received a prize for the highest standing in first year medicine. First prize of the Dr. Ralph W. Leigh award in physiology went to James R. Morton of Bismarck and second prize to Arden O. Anderson of Grandin. The prize in pathology went to Warren R. Jensen of Bismarck.

OPEN HOUSE for the new Leeds Memorial Health Center was held at Leeds on Tuesday, July 8. Plans for the clinic began back in 1945, and were first as a hospital, then with the clinic as a modified objective.

* * *

AT a meeting of the state mental health committee at Jamestown, August 2, a proposal was made recommending the construction of a $500,000 psychiatric school at the Jamestown State hospital. It was pointed out that although nurses in the state are required to have three months psychiatric training, that training is not available at the present time.

* * *

DR. H. MILTON BERG, Bismarck, was installed August 9 as president of the Rocky Mountain Radiological Society at the annual meeting in Denver.

* * *

New locations and appointments . . .

DR. FRANK G. WHITE, of Omaha, to Leeds . . . Dr. James J. Moses, a native of Bismarck, and Dr. James Nelson, Chicago, to the staff of the Quain and Ramstad Clinic, Bismarck . . . Dr. Philip O. Dahl, Denver, to the Missouri Valley clinic, Bismarck.

* * *

Dr. George R. Thompson, University of Michigan, to the Fargo Clinic department of obstetrics and gynecology . . . Dr. Walter A. Craychee, formerly of Mandan to Oakes . . . Dr. Robert J. Strobel, Bismarck, to private practice in Moscow, Idaho . . . Dr. M. A. Hayward, Winnipeg to Ellendale . . . Dr. H. R. Davidson, 1951 graduate of the University of Wisconsin, to Riverdale as new contract physician for army engineers corps . . . Dr. Charles R. Lambert, Ashland, Kentucky, to Missouri

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For many years the Ulmer Pharmacal Company has made an exceptionally fine line of ointments and creams for topical application. They were one of the first in the field producing water soluble and water miscible bases for topical application. All ointment and cream bases employed by the Ulmer Pharmacal Company are tested by controls to eliminate as far as possible all possibilities of allergic manifestations from the base itself.

We were first in the field to recognize the fact that liquid petrolatum produced a large number of allergies which often times have been attributed to the medication employed. For that reason mineral oil has been held to a minimum or completely deleted from most of our ointments and creams.

In your dermatological conditions where bacterial infections are being considered, we would like to call your attention to our group of tar creams including ULTAR, ULTARZOLE, VATAR A, VATAR B and SAL-SU-TAR. For the treatment of fungicidal conditions, we recommend very highly KUDELATE comprising copper undecylenate and dioctyl sodium sulfosuccinate. SAL-SU-TAR is also effective in this group.

For burns, bruises and slow healing skin conditions, we would like to recommend any one of the following: COL-VI-NOL, VADZOLE, CALZO or ANDOIN.

These are only a few of the many suggestions which we have to offer in the treatment of skin conditions. We shall be happy to supply you a sample of any one of these ointments or creams.

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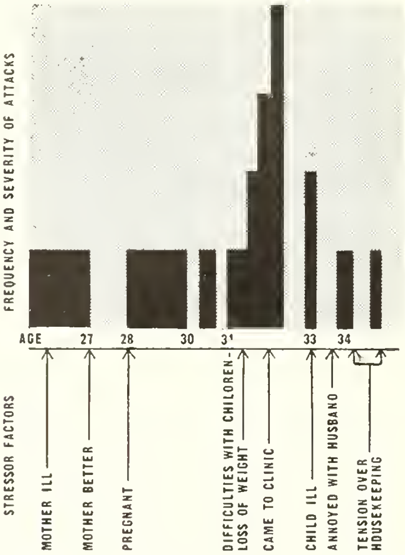
Stress . . .

Stressor factors which evoke autonomic responses occur often in our civilization. They are not always of external origin; frequently, stress springs from the "well of uncertainties, the fears, the angers, and the hostilities that an inadequate childhood nurtures in troubled people in a troubled world."[1]



After: Relationship Between Life Stress And Symptoms — Stevenson, I. G.P. *4*: 67 (Dec.) 1951

When emotions aroused by these stresses are not dissipated in appropriate biological behavior, heightened autonomic impulses beat against a "moored" physique.[1]

Incessant "emotional buffeting" impinged on labile autonomic pathways is likely to produce deviations from normal body function and *a rash of symptoms.* In such cases, both branches of the autonomic nervous system are involved. For symptomatic relief oral administration of cholinergic and adrenergic blocking agents and central sedation has proven successful. Drugs effective for the several actions respectively are: Bellafoline, ergotamine tartrate and phenobarbital.

In the majority of cases inhibition of the several branches of the autonomic nervous system is necessary to restore it to more stable function and thereby "dampen" the overactivity of the disturbed organ systems. Therefore a preparation of the above several drugs has been made available as ***Bellergal;*** each tablet of Bellergal contains:

Bellafoline	0.1 mg.
Ergotamine tartrate	0.3 mg.
phenobarbital	20.0 mg.

Detailed literature on the subject will gladly be sent on request.

[1] *Cleghorn, R. A. and Graham, B. F.: Recent Progress in Hormone Research, Vol. IV, New York, Academic Press, Inc., 1949, p. 323.*

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Dr. Orin D. Dawson, Minneapolis and Dr. Robert B. Breitenbucher, Minneapolis to the Veterans Administration hospital at Minot . . . Dr. William Buckingham, Fargo, and Dr. Robert W. McLean, Louisville, Kentucky, to Hillsboro . . . Dr. John Johanson, Buchanan, Saskatchewan, to Kenmare . . . Dr. Burton G. Olson, Minneapolis, to Minot.

Minnesota

A $30,000 check for heart disease research was presented to the University of Minnesota August 22 by the Minnesota Heart association. Otto B. Klett, association treasurer, gave the check to Dr. Harold S. Diehl, dean of medical sciences. The remainder of a $50,000 grant for the year 1952-53 will be turned over later.

* * *

Dr. Wesley W. Spink, professor of medicine at the University of Minnesota, left September 7 for Spain to start a survey of brucellosis in southern Europe. He will act as a consultant to the World Health organization and the food and agriculture organization of the United Nations. Dr. Spink is director of the United States Brucellosis research center of the two U.N. agencies at the University of Minnesota.

* * *

Dr. J. A. Myers, professor of medicine and public health at the University of Minnesota and chairman of the Journal-Lancet board of editors, was one of the speakers in the scientific program of the Second International Congress on Diseases of the Chest and the International Union against Tuberculosis which was held August 24 to 30 in Rio de Janeiro. Two other former Minnesotans who participated in the meetings were Dr. James E. Perkins, managing director of the National Tuberculosis association and Dr. Robert J. Anderson, chief of the division of chronic diseases and tuberculosis, U.S.P.H.

South Dakota

Dr. L. F. Beall was honored at a community party and open house, marking the occasion of his seventy-second birthday, and honoring the doctor for his 48 years of service to the community.

* * *

Dr. H. Russell Brown, Watertown, has been appointed superintendent of the Codington County Board for a two-year term by the Public Health Adivsory Council.

TREATMENT OF POLIOMYELITIS WITH A SYMPATHOLYTIC DRUG

(Continued from page 472)

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for prolonged, non-narcotic control of pain

64 cases

in surgery of the head, neck and extremities[1,2]
Postoperatively 35 patients required no narcotics, another 24 required only 1 or 2 doses; no patient required more than 4 doses.

187 cases

in thoracic and upper abdominal surgery and chest pain[1,2,3,4]
Postoperative intercostal nerve block with Efocaine allowed patients to breathe deeply and cough freely without pain, obviated the need for respiration-depressing narcotics—"an effective means of preventing postoperative pulmonary complications."[4]
"...more than 50 blocks for miscellaneous chest pain...were all successful."[4]

346 cases

in lower abdominal surgery[1,2]
Convalescence was pleasanter and early ambulation was facilitated with Efocaine. In one group of 285 patients, 87 required no postoperative narcotics, and 141 needed only 1 or 2 doses.[2]

246 cases

in anorectal and vaginal surgery, pruritus ani[1,2,5,6]
"A dramatic relief of postoperative pain...in almost every instance...postoperative narcotic requirements were virtually eliminated."[5]
"All of the patients with pruritus ani were benefited by...Efocaine."[6]

45 cases

following tonsillectomy[7]
"The results...were most dramatic. A high degree of local pain control was achieved in every instance."

94 cases

after episiotomy[8]
"A high degree of episiotomy pain-relief was obtained...patient morbidity was greatly reduced, and a more pleasant convalescence achieved."

25 cases

in minor and office surgery[1]
Relief of postoperative pain was excellent in 76% of the group, good in the remaining 24%.

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1. Ansbro, F. P., and others: Anesthesiology *13*:306, 1952. 2. Iason, A. H., and Shaftel, H. E.: Postoperative Pain Control, presented before the Section on Anesthesiology of the American Medical Association, Chicago, Ill., June 10, 1952. 3. Deaton, W. R., Jr., and Bradshaw, H. H.: Am. Surgeon *18*:616, 1952. 4. Puderbach, W. J., and others: Journal Lancet 72:203, 1952. 5. Tucker, C. C.: J. Kansas M. Soc. *53*:230, 1952. 6. Gross, J. M., and others: New York State J. Med. 52:1413 (June 1) 1952. 7 Penn, S. E.: Arch. Otolaryng. *56*:59, 1952. 8. Cappe, B. E., and Pallin, I. M.: Am Pract & Digest Treat. *3*:739, 1952.

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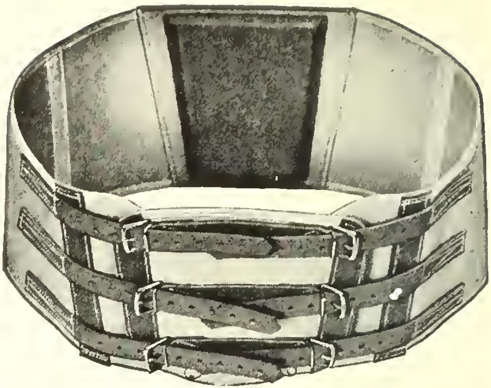

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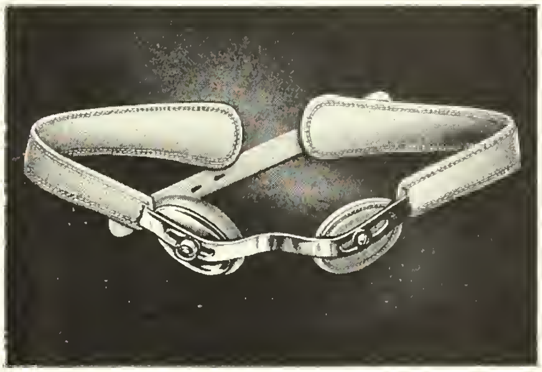

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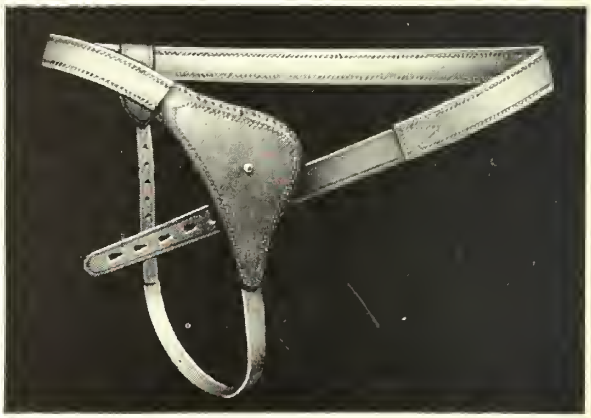

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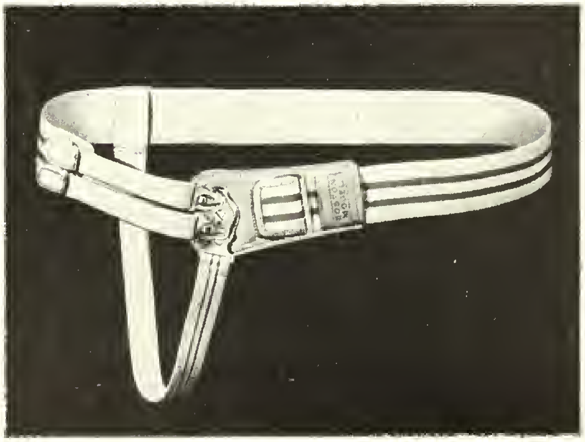

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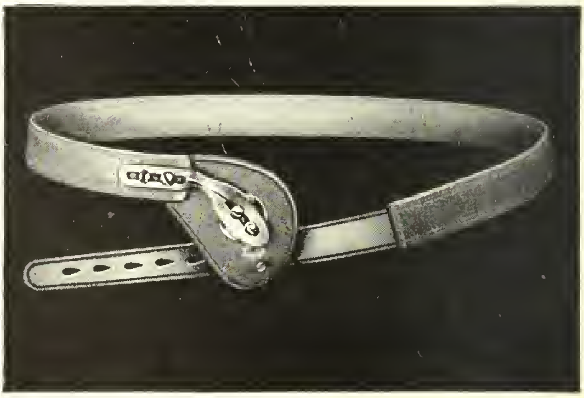

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Notices . . .

Minnesota Academy of General Practice

The Second Annual Fall Refresher Course of the Minnesota Academy of General Practice will be held at the Hotel Radisson, Minneapolis, on Wednesday, October 29. The following program has been announced:

8:20 a.m.—Medical film.
9:00– 9:20—Tague C. Chisholm, M.D., *Treatment of Hernia in Children.*
9:20– 9:40—Paul S. Blake, M.D., *Head Injuries.*
9:40–10:00—R. N. Bieter, M.D., *The Antihistamines and Related Drugs.*
10:00–10:20—L. A. Lang, M.D., *Local Anesthesia in Obstetrics.*
10:20–10:40—Exhibits.
10:40–11:00—Manley Brist, *The Doctor and the Law.*
11:00–12:00—Phillip Lewin, M.D., *Painful Feet*
12:00—Luncheon. Philip Thorek, M.D., Chicago, *Jaundice,* with comment by Cecil J. Watson, M.D.
2:00– 2:40—Symposium on Skin Disease, E. T. Ceder, M.D. and Orville Ockuley, M.D., *Treatment and Management of Dermatitis.*
2:40– 3:20—Symposium on Office Gynecology, Melvin B. Sinykin, M.D. and Louis Freidman, M.D., St. Paul.
3:20– 3:40—Exhibits.
3:40– 5:00—Symposium on Hypertension, E. T. Bell, M.D. as moderator and A. C. Corcoran, M.D., Cleveland, and J. E. Estes, M.D., Rochester.

All physicians are cordially invited to attend. There is no registration fee, but a $4.00 luncheon ticket is required. Reservations should be made with Dr. Robert Quello, 730 LaSalle Building, Minneapolis, Minnesota.

* * *

University of Minnesota Continuation Courses

A Course in Treatment of Diseases of the Chest will be presented in conjunction with the American College of Chest Physicians and the Minnesota Chapter of the American Trudeau Society at the Center for Continuation Study on October 16–18. The course is intended primarily for physicians in private practice.

A course in Gastrointestinal Roentgenology for Radiologists will be held from October 20 to 25. On Wednesday, October 22, the annual Leo G. Rigler lecture will be given by Dr. B. J. Kirklin, department of radiology, Mayo Foundation, Rochester, on the subject, "Cholecystography."

A course in Medical Economics for Physicians will be presented October 30 and 31. Subjects include the business aspects of medical practice, the doctor and the law, investments, and office planning. At noon on Friday, October 31, a homecoming program for physicians will be held at the staff meeting of the University Hospitals. Friday afternoon and Saturday morning, homecoming clinics will be held at the University Hospitals.

A course in Endocrinology will be presented on December 4 to 6, and will include discussions of recent advances in the clinical use of ACTH and cortisone, the treatment of diabetes mellitus, and other common endocrine disorders. Dr. Dwight J. Ingle, pharmacology research, the Upjohn Company, Kalamazoo, Michigan, will be the guest faculty member for the course. Dr. Ingle will also present the annual Journal-Lancet lecture on December 4.

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THE INCIDENCE OF DIABETES MELLITUS AND GLYCOSURIA IN 19,358 COLLEGE STUDENTS

(Continued from page 481)

surics were dominant in male as compared with female, over and above the population variation. Fasting blood sugars were essentially equivalent in the renal glycosurics, temporary hyperglycemic glycosurics, and normals. In the temporary hyperglycemic glycosurics, after a high peak there was a return to the low normal. So far as the family history was concerned, there was a definite tendency to a positive history in the diabetics, but the thought of dominance was less than would be anticipated. In the diabetics the females were predominantly overweight whereas the males were normal and underweight. In the remainder, there were mostly males, but all were essentially normal. There was no statistical variation in blood pressure, although there were two abnormal readings in the diabetic group and one in the renal glycosuria group.

CONCLUSION

In this study, the total number of glycosurics found on routine examinations in young adults was higher than that generally reported. Occurrence of diabetes mellitus in males and females was about equal; a family history of diabetes was merely suggestive; weight is a factor to be considered; obesity occurred predominently in the females of young adults who have diabetes.

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GENERAL THEORY OF PAIN

(Continued from page 485)

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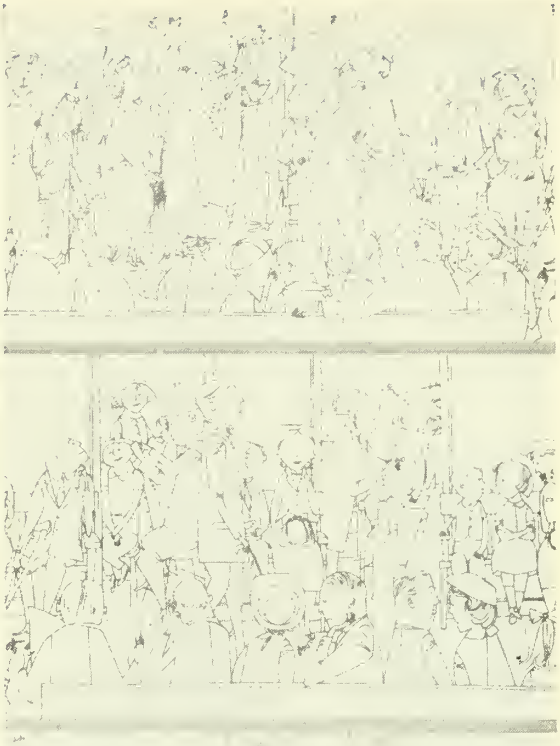

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TREATMENT OF CARCINOMA OF THE RIGHT COLON—(Continued from page 478)

review, report one-stage aseptic end-to-end ileocolostomy in 20 unselected cases with one postoperative complication and no operative deaths.

CONCLUSIONS

1. Bowel obstruction due to cancer of the right colon is more common than many believe. When present, the hazard to the patient is great. It is recommended that, whenever suspected, a flat x-ray of the abdomen be taken. If appreciable distention is present, suitable decompression measures should be instituted at once.

2. Multiple lesions of the colon are not uncommon. When a lesion of the right colon is suspected, the remainder of the colon should be examined by palpation at the time of surgery, by barium x-ray and proctosigmoidoscopy.

3. The one-stage hemicolectomy and ileotransverse colostomy is the most suitable operation for cure of the majority of cases of cancer of the right colon.

4. A review of twenty-one patients with cancer of the right colon is presented.

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HAMLIN MATTSON, M.D.
Minneapolis, Minnesota

PROBABLY the earliest reproduction of an operation for hernia was taken from a tomb in the Necropolis of Saqqarah in Egypt[1] about 2500 B.C.

After at least 44 centuries of hernia procedures, the problem still is unsettled. In the late decades of the nineteenth century doubts were expressed in surgical meetings that more than a few ever were cured. The first operation under antisepsis in 1871 by Lister was a hernioplasty. Lister's pupil, H. O. Marcy, presented a paper on hernia at the Seventh International congress in London in 1881.[2] Eduardo Bassini of Padua, Italy, attended the meeting and apparently sensed that Marcy's success lay in high ligation of the sac and restoration of the obliquity of the inguinal canal. Bassini's paper in 1890[3] tended to restore confidence of the laity and surgeons and a multiplicity of variations in method followed.

But all has not gone well with the house Bassini built. Individual surgeons were convinced they had few recurrences, but publication of recurrence figures from institutions were disturbing. As late as 1934 Andrews and Bissell[4] in America published a recurrence rate of 27 per cent for direct inguinal hernias and advocated abandonment entirely of the operation for direct inguinal hernia except for pain. As recently as 1949[5] a large university clinic in America published recurrence rates of 6 per cent for indirect and 31 per cent for direct inguinal hernias, in a three to seven and one-half year followup.

Such a high percentage of failures entails considerable economic loss, to say nothing of the occasional deaths involved in operations for recurrences.

Increased interest is being focused on approach, based on restudy of the anatomy and physiology of the inguinal canal. Such an approach was initiated by McVay's restudy of the anatomy of the inguinal region.[6–11] Enough time now has elapsed to permit some evaluation of the use of such principles. McVay found that the (1) inguinal ligament is a guy rope, a marginal structure, (2) the internal oblique arises not from the inguinal ligament but from the iliopsoas fascia and inserts into Cooper's ligament, (3) the inguinal portion of the transversus arises from the iliopsoas and inserts into Cooper's ligament and (4) suture to the inguinal ligament

---

HAMLIN MATTSON, *a graduate of the University of Minnesota medical school in 1926, specializes in surgery in Minneapolis, serves in the surgery departments of University, Swedish and Fairview hospitals, is president of the Minneapolis Surgical Society. He is a member of Sigma Xi, F.A.C.S. and the author of one book and a number of papers on his specialty.*

*Abstract of paper presented by invitation at the meeting of the Surgical Society of Sweden at the University of Lund-Malmo, April 25, 1952.

violates restoration of anatomy to normal. He found also that pure fascia such as transversalis in the floor of the triangle of Hesselbach does not have the strength necessary to repair a musculoaponeurotic defect such as occurs in direct inguinal hernia.

PHYSIOLOGY OF INGUINAL CANAL

We have tended to ignore functional physiology of the inguinal canal. Its obliquity should be restored. The sphincter action of the internal oblique should be restored. The sphincter action of the internal oblique, which is abolished in operations such as the Halsted and Stetten, should be preserved. Mathisen[12] of Norway has pointed out that the internal ring is not round but U-shaped. As the transversalis contracts, the internal ring is pulled upward and outward and the internal oblique moves somewhat medially. Any doubting Thomas can be convinced of the strength of the sphincter action at the internal ring by asking the anesthetist to waken partially a muscular patient. If the surgeon then will insert his finger in the internal ring, he will become convinced of the strength of the sphincter.

Clean tendinous and aponeurotic structures sewed to clean tendinous aponeurotic structures without tension give strongest and most lasting repair. Scar tissue heals poorly. Muscle sewed to aponeurosis is insecure.[13]

We have tended to minimize the hernia problem, assume it has been solved, and consider it as one of the stepping stones for the fledgling surgeon, while senior men busy themselves with what seem to be more complex problems. We have often fitted the patient to the operation rather than the operation to the patient.

COOPER'S LIGAMENT

Cooper's ligament, called the pectineal ligament by some anatomists and the superior pubic ligament in the BNA nomenclature, was described in 1804 by Sir Astley Cooper. He advocated its use in hernia procedures. Little attention was paid to it for almost a hundred years. Narath of Utrecht used it and Lotheissen[14] used it in the repair of inguinal and femoral hernia in 1898. It is a strong fibrous band extending lateralward from the base of the lacunar ligament along the pectineal line of the superior pubic ramus, to which it is attached firmly. It is so strong that with a good hold on it the patient can be lifted off the table.

With a background of some years in investigative work in hernia,[15,16] I was confronted during World War II by a soldier with recurrent hernia in whom all the structures which are used in standard hernia procedures were destroyed. Using Cooper's ligament as had Lotheissen, I also used a flap of rectus and pyramidalis sheath, the only way in which that hernia could have been repaired unless fascia lata was taken from the thigh.[17–19] With the experience on soldiers from September 1, 1943, and that gained since returning from military service, I have operated on 323 inguinal and femoral hernias: 157 indirect, 88 direct, 27 both direct and indirect, 41 recurrent, and 10 femoral.

All these patients were told that the principle of repair differed from that in common use, that recurrence was not necessarily a reflection on the surgeon and they were encouraged to go to their physicians and report to me if any recurrence was found. Most of the patients were from the Minneapolis area. I realize the limitations of such a followup, and a study based on personal physical examination after 10 years is contemplated. As pointed out by Mayo and Keeley,[20] a ten year followup is more logical than one of five or less. Of 332 hernias in 286 patients, Watson[21] found 64 recurred at once, 45 at one year, 56 at one to five years, 28 at 6 to 10 years, 30 at 11 to 19 years and 12 at 20 to 29 years.

RECURRENCES

Of the 323 hernias reported here, four recurred; all four were direct hernias. These four have been operated on and two recurred between the lateral Cooper's ligament suture and one came through at the rectus flap hinge. While the above does not represent the final recurrence figure, yet low recurrence rates are being reported by others. McVay[11] reported no recurrences in 100 inguinal and femoral hernioplasties in 1948. Four were not traced. Harkins,[22] professor of surgery at the University of Washington at Seattle, followed 35 per cent of 367 cases over two years and found 2.3 per cent recurrences as to number of hernias. I do not believe that recurrences will be less than 1 per cent in all types of inguinal hernia after 10 years but I am convinced from this experience that a competent surgeon with some experience in the method can attain a recurrence rate of 1 per cent or less in indirect and 3 per cent or less in direct inguinal hernias.

METHOD

I operated on all 323 hernias. Interrupted silk technique was used throughout. In indirect hernias, where Hesselbach's triangle floor was shown by the examining finger within the abdomen to be adequate, only the defect in the transversalis fascia at the internal ring was repaired after first ligating the sac high. Nothing else was done. Where redundancy in the floor of Hesselbach's triangle or a direct inguinal hernia were encountered, the transversalis was incised and the redundancy or hernia were reduced into the extraperitoneal tissues, except in the case of a long, narrow sac, which was excised. Then the transversalis was closed. If the so-called conjoined tendon was tendinous and not muscular it was sutured to Cooper's ligament after first making a relaxing incision in the rectus sheath. If the conjoined tendon was muscular, or if it was absent as it is in 7 per cent of bodies, according to McVay,[23] a flap of rectus and pyramidalis sheath was turned back and sutured to Cooper's ligament. The upper portion of the flap was sutured to the femoral sheath. If the rectus sheath was inadequate, fascia lata was used. If the hinge of the rectus flap was weak, as it sometimes is because of the change in direction of the fibers, a reinforcing suture line was taken in it. The same operation was used for femoral hernia. The inguinal ligament is ignored. Recurrent hernias are operated on to advantage in this manner as a virgin field is entered and old scar tissue circumvented. Bilateral hernias should have about the same recurrence rate as single hernias as the tension factor is avoided. One of the recurrent hernias in this series, referred by Dr. Milton Hebeison of Chaska, Minnesota, had been operated on five times before. There was no recurrence as shown by examination after two years.

A hernioplasty done according to the concepts outlined above is not an easy operation. It involves working in proximity to important blood vessels and suturing to the fascial sheath surrounding the femoral vessels. In short, it involves a reconstruction of the lower abdominal wall in the inguinal region according to the defects present in that individual; and the possible defects are multitudinous. No two thumb prints are alike and no two defects in the same type of inguinal hernia are alike.

But if recurrence rates of 1 to 3 per cent as reported by men experienced in the method are maintained, the effort and greater time needed for the operation should be well worth while and the superiority over methods in common use in the past 60 years proven.

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Richard Everingham Scammon, 1883-1952

HARRY A. WILMER, M.D.
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I FIRST SAW Dr. Richard E. Scammon eighteen years ago, when I attended University of Minnesota high school. He talked on the Great Black Plague to a student assembly. At that time he was dean of medical sciences at the University of Minnesota, and he was a famous man. It was generally conceded among my elders that he was one of the most gifted and brilliant men at the University; some were so bold as to say among the scientists of the United States, and even the less bold were prone to refer to him as a genius. To the less discriminating, perhaps, this was a reference to his eccentricities. To the more discerning it was probably a clearer perception. Along with many laymen, my father spoke about him with reverence. He walked the campus with great ponderous stride, lumbering with an awkward gait, cigarette ashes on his clothes, clearly identified by a great black mustache. His face had the rugged cast of a Northumbrian farmer and his eyes the penetrating softness of a monk leaving a medieval monastery, where with great delicacy and devotion he had been illuminating with a brush the letters of earlier manuscripts for other men to read. If you stopped to talk with Scammon he would gesture with broad fanlike movements of his hands, for he was an enormous man in his gestures as in the scope of his mind.

DR. R. E. SCAMMON

He emerged from his offices at the University and from its libraries, where he was most at home, at any hour of night or day. He was oblivious to time and the rigid, routinized demands of an alarm-clock-ticking society. He lived in many centuries and was at home in one as well as another. A colleague once quipped that he had the greatest mind of the fourteenth century. I daresay the colleague's enlightenment on the fourteenth century had come from Scammon. He lived the lives of the men he studied, and he taught with the brilliant, vital excitement of a man utterly possessed of his subjects. He mastered many: anatomy, embryology, the history of science, logic, mathematics, the populations of the world, history, philosophy and his particular love, the growth of man. He embarked in his latter years upon a *magnum opus* on this subject, which was to fall victim to his perfectionism, his endless search for the original source material and for the overflowing of material to be written, when the floodgates began to open. He once said, in response to an eloquent introduction, "I am but a jack of all trades and master of none." He was, indeed, however, a master in his chosen specialty, and if not the complete master in all the others, excelled most scholars in these fields. He was held in the highest esteem by colleagues in the various disciplines of science, and he moved from one to another with the freedom known only to men whose minds are not compartmentalized. His interest flowed and weighed, like mercury.

As a graduate student and later a colleague, I worked with Dr. Scammon for fifteen years, off and on. I lived near him, took trips with him; but even at this, knew but a portion of a portion of the man. He possessed what to others was a monstrous omnivorous memory, yet if he ever overshadowed a man it was because of the jealousy of those who stood in his shadow. I never heard him speak unkindly of another. When I once told him of someone who spoke unkindly of him, he countered with some compliments to the accuser and followed with Voltaire's devastating repartee: "Perhaps we are both wrong." But he never hesitated to criticize another man's judgment if he considered it fallacious.

His lectures will long be remembered by his students: the great teacher standing in the am-

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HARRY A. WILMER, *who practices psychiatry at Menlo Park, California, has contributed frequently to the pages of the* JOURNAL-LANCET. *A graduate of the University of Minnesota in 1941, Dr. Wilmer has published such well known books as "Huber the Tuber," "Corky the Killer" and "This is Your World."*

phitheatre, drawing simultaneously with both hands and speaking from but a few jottings of notes, is deeply ingrained upon all his sensitive students. It was found necessary to enlist the aid of a second student to capture his lectures; while one copied the drawings, the other wrote the words. He was completely convinced of and devoted to the graphic presentation of scientific material. One can follow in his writings the gradual condensation of his material into bigger and bigger pictures and the gradual diminution of text. Though editors were skeptical, readers seemed enthusiastic.

Here was a man both verbal and articulate, who, however, stumbled for words and sought them with diligence as for a legal phrase in court. His lectures were casual and seemed spontaneous, but were always preceded by rereading his notes and all the available sources from the library. He often prepared a full day and an night for a students' lecture. He once remarked that many of his colleagues seemed to feel that anything important was written only in the last ten years and usually at their own institution. This he judged by the popularity of the most recent journals and the fact that he might keep an old bound volume in his office for months or years without a request for its return. He was encyclopedic; he gave his knowledge to all, freely and equally. When once offered an honorarium for a lecture elsewhere in the state, he replied, "But I am a public servant. Can you pay me? There is no fee." Sometimes his lack of tact was not politically wise. He was apt to keep a dean waiting in the outer office while he talked to a freshman student, and it did not matter if the dean had an appointment. You might, at this point, say to yourself there should be more such men—or fewer—depending upon your feelings. Actually, I do not believe he understood or felt that any wrong had been committed. He was wholly independent, and while a great admirer of formal ritualism in affairs of state, church and English monarchy, could not tolerate it in the affairs of man to man. Governors called him by his first name, and he them.

It is no wonder that being a dean was a failure to him. He was prone to describe deaning as being an honest gambler, a man who sat at the gaming table with a green shade over his eyes and turned up card after card without caring what it was. Scammon as a dean was an anachronism that could not endure. Later, when he was made Distinguished Service Professor, false accusations were made against him. Hearsay is a vicious animal to cage. Diligent search on my part, over many years, has failed to reveal evidence that here was anyone but a man of the highest intellectual integrity and temperate habits; humility and loyalty were among his greatest qualities. His frailties, of which there were many, were minor and of a sort that in another he himself would not countenance discussion of. A psychologist once applied for a state job to him, knowing he was an intimate friend of the governor; Scammon's brief comment before he ejected the man was an acid, "And you call yourself a psychologist!" Although Scammon understood little about psychology and psychiatry, his intuitive understanding and tolerance carried him, where other men fell to prejudice and avarice. His goodness and greatness were felt by all his students, and his lecture halls were full to standing.

If he wrote a few books, what does it matter that he had a hundred to write, or a thousand? There is often an intellectual mourning in university circles for manuscripts which fail to reach print. Scammon called this lead poisoning. But he did write, and he talked, and he was a friend to all who wished him for a friend. His personality and scholarship have forged many lesser men into a brilliance they did not realize they possessed.

I suppose he has changed the face of science in his own way as much as is the lot of a single man to do. No weighing of published manuscripts or counting of titles in a coldness of pursuit. But there was a warmth and a love utterly devoid of sentimentality. Aphorisms which he conceived on the spot have become part of many people's lives: There are few times you can afford to prove you're right.

There follows a resume of the academic career of Dr. Scammon appended to this essay. Briefly it can be said he was born in Kansas City, Missouri, on July 9, 1883, was at the University of Minnesota as professor of anatomy from 1914 to 1930; dean of medical sciences there from 1931 to 1935; distinguished service professor, Graduate School, 1935 until his retirement. In 1930 to 1931 he was professor of anatomy and dean of the division of biological sciences at the University of Chicago.

In June, 1952, when he became seriously ill with malignant hypertension and heart failure, I visited him for several days at his farm, "Fewacres," in the Ozarks near Branson, Missouri, where he retired in 1949. It was apparent he would not live long. Late one afternoon, on a dusty Branson road, I wrote this poem:

SCAMMON

Where leads the lonely road
That clings the earth
And climbs the hill?
Who knows but Scammon?

The Branson road
From river to Fewacres
Through Ozark woods
From Minnesota's academic pinnacle,
Now beneath white bursting sun
That shatter-splatters heaven
With jagged incandescence
And beats upon the last retreat.

Yet in the night
The west wind blows
To rest the restless sleeper.

Where leads this way
Beneath Missouri's sun?
The parched earth crumbling, water-famine.
Upon the road the great man strode
Alone; alone but for a few
Who knew the blessed ways of Scammon.

Man's Fewacres,
God's dying man,
Whose calm and gentle life
And patient brilliant words
Impressed the listening listeners.
Man good, man great,
Man of simple human frailties,
Walked ever certain forward
With hesitant and searching gait;

Who saw cloud-high the great perspective;
Not the trees
But where and how the ridges ran
And patterns of all things.

But it's the lonely road
For lonely men who vision
Without hate or envy, avarice or greed
And walk upright.

The highway turns
Into the barren, rocky path
Where roses, dahlias and iris bloom
And memories of men
Whom he has touched;
And Tyke a-barking
And Julia, patient, waiting, pained.

He searched with questions;
To the end a way unbridled.
Such a mind as this
The breadth of Leonardo's.
The spark of genius
Oft attributed to men
But uneasy, graceless, worn by them,
Rested laurellike on him.

Not what is useful
But what is true:
He searched and plotted on his graphs
And set less able men
Upon his noble paths;
For curiosity and generosity
Burned bright until the last.

And in the end
The solitary journey
Of such a man
Led back to childhood's hills,
The earth-world's wonderment.

Here was Richard Scammon,
Who struggled with belief in God and man,
Embodying both of them;
A special angel from the first
And the finest of the last.

(June 14, 1952)

At 8:20 on the morning of September 13, 1952, a Saturday, I was interrupted while consulting with a patient, to be given a telegram. Strange that I had no premonition, even as I held the yellow envelope and though two days previously I had received a letter from his friend, Feike Feikema, relating that Scammon was dying of malignant hypertension. It is interesting that I never formulated the diagnosis in words, though I knew it to be the case. The boy handed me the wire, saying, "Bad news on a cold morning." But then what could one say? There was a dark penciled box around the letters visible through the transparent window of the envelope: S.SRA 5/23. I had heard that death messages are marked with a star, but the meticulously hard-penciled border told me the message I did not want to imagine: "Dick died in his sleep this evening—" and signed by Julia, who was his devoted, understanding companion, without whose own giving and understanding I doubt if Scammon's life would have been happy.

Other men who think of the accolade of science, who shed tears over books that might have been, who dream of the top rung of the ladder, cannot understand, perhaps, the happiness of a man who begins with the pages of a book marked in Roman numerals and continues through each page to the epilogue; that his essential happiness could, indeed, be extracted from pages of other men's books.

He held a strange, almost Olympian detachment from mankind, seeing in the world its humanity and inhumanity, its cruelty and kindness, and forever aloof from its outrageous, violent hatreds and conflicts, and from entangling human personal relationships. Forever a part of his work, which was in itself dealing with statistical columns and graphs and the struggles of men in centuries past, he once wryly repeated the sophisticated criticism of a colleague: "Dick, you play the game safe. Your work is never controversial; nobody ever jumps on you because the measurements are simply measurements." Yes, that was it. He had found a part of science that was as near the ultimate in truth as exists. Only the ways of refinement of measurement or expression of the facts could be improved. He was the first to acknowledge it, and in his own field was usually the first to invent it.

Although he was loved and admired by most people, his personality or he himself seemed to withdraw at affection, and revealed himself best when criticized. When he was chairman of the Minnesota State Resources Commission, appointed by one governor and reappointed by another, his detractors said, "Scam, your committee does not do anything. It just sits and listens to people and accumulates data and issues summaries, reports and analyses." Yes, that was it too. He was not the counsel for either client; he considered himself counsel for the situation. He felt that the function of the Commission was judicial: to evaluate and integrate facts; to point the way. He left for others the multicolored interpretations, the guesses and extrapolative hunches. The compilation and study of facts were his. It is with good reason that he was known by some of his colleagues as "The Source." He had no feeling that his way was better than any other man's way, more fraught with human emotions and frailty, or in the human storm. As he was prone to say when people pointed out the different ways of life in their pursuit of happiness in their careers, "It isn't that one way is better than another; it's just that they are different." Surely he has come to the greatest rest at the fulness of a simple and noble life.

APPENDIX

Richard E. Scammon, 1883-1952.
Born in Kansas City, Missouri, July 9, 1883.
A.B., University of Kansas, 1904; A.M., 1906. Ph.D., Harvard University, 1909.
Instructor in zoology, University of Kansas, 1906–07.
Austin teaching fellow, Harvard University, 1907-09.
Instructor in anatomy, Harvard University, 1909–10.
Assistant professor of anatomy, University of Kansas, 1910–11; associate professor, 1911–13.
Professor of anatomy, University of Minnesota, 1914–30.
Professor of anatomy and dean, Division of Biological Sciences, University of Chicago, 1930–31.
Dean of medical sciences, University of Minnesota, 1931-35.
Distinguished service professor, Graduate School, University of Minnesota, 1935——.
Chairman, Minnesota Resources Commission, 1939——.
Member, Advisory Board, Minnesota Institute of Government Research.
Retired to Branson, Missouri, 1949.
Died at "Fewacres," Branson, Missouri, September 12, 1952.

DR. DWIGHT INGLE TO GIVE JOURNAL-LANCET LECTURE

The tenth JOURNAL-LANCET lecture will be given on December 5, 1952 at the University of Minnesota medical school by Dr. Dwight J. Ingle, pharmacology research division, The Upjohn Company, Kalamazoo, Michigan. Dr. Ingle, who did graduate work at the University of Minnesota and the Mayo Foundation at Rochester, is particularly interested in carbohydrate metabolism and adrenal cortical research. He is also guest faculty member of a course in endocrinology to be given at the University December 4 to 6.

The first of the JOURNAL-LANCET sponsored lectures was given on April 21, 1941 by Dr. Rene Dubois of the Rockefeller Institute for Medical Research. Since then the lectures have been held each year, or as opportunity came to bring an outstanding speaker to the campus. In 1950 the lectureship was transferred abroad when Dr. J. Arthur Myers, chairman of the JOURNAL-LANCET board of editors, spoke on "Tuberculosis Control in a New Country" at the Hebrew University in Israel.

For this tenth lecture, Dr. Ingle's subject will be, "Some Studies on Experimental Diabetes." All interested physicians in the area are cordially invited to attend.

Notes: Obstetric and Hematologic*

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INVESTIGATION of the preeclamptic toxemias from a hematologic approach led to the hypothesis that the true toxemias of pregnancy are diseases caused by cell substances from the cells of the products of conception, substances that the cells of the mother do not possess in their vital chemical building material structure, and which are literally toxic to her cells. Her cells tend to respond to this injury by the production of antitoxins specific to the attacking cell substances involved. Of such cell substances are the group cell substances A and B; the Rh; and all cell substances against which the mother may generate relatively protective specific antitoxins, as evidenced in crossmatching. The antitoxin is a response to definite cellular injury. Development of a specific antitoxin is prima facie evidence that the cell substance provoking the antitoxin is toxic to the maternal cells. By this hypothesis every clinical and pathologic finding in an adequately proven true toxemia can be logically accounted for. Thus the high degree of probability of the hypothesis is attested.

From a practical standpoint, the hematologic approach has been found to be most rewarding. By determining the cell substance status of the bloods of husband and wife, one has a means of predicting more accurately whether or not a woman may develop a true toxemia. By following antepartum and postpartum maternal antitoxin titers, one can prognosticate more accurately the relative safety of a future pregnancy. It is a cell substance and immunological problem. The hypothesis of cell substance cause rationalizes and compellingly directs the use of whole blood or plasma transfusions in the severe true toxemias, to replace maternal blood elements depleted by the cell substance toxin, and to neutralize the toxin, as blood is used in erythroblastosis fetalis and allied fetal injury, to replace fetal blood elements depleted by the specific maternal antitoxin, and to absorb the antitoxin. Blood tranfusion in the true toxemias is seen to be a combination replacement, absorption and antitoxin therapy when the A or B cell substances are involved as toxins.

From a broad philosophical standpoint, the findings point to the following conclusions. 1. In the true toxemias of pregnancy, and in erythroblastosis fetalis and allied fetal injury, we are witnessing the manifestations of the toxin antitoxin mechanism of chemical warfare that functions, in nature, between different cell substances groups, not only at the same and different phylogenetic levels, but even within a species. 2. The constitution of human bloods as regards their antitoxin content, inherited or actively generated, is either the result of the parasitic fetus-mother relationship operating since placentate evolution, or, a recent fetus-mother relationship. 3. Against relatively virulent intraspecies cell substance toxins, susceptible stocks have evolved inheritable complements of relatively protective specific antitoxins, as other inheritable protective mechanisms are assumed to have been evolved. 4. These antitoxins, though inherited by male and female alike, function in nature only as a relative protection to the female if she happens to engender products of conceptions containing cell substances that, for ages, have been ancestral enemies to members of her cell substance stock inheritance. 5. The true toxemias of pregnancy, and erythroblastosis fetalis and allied fetal injury, are the results of the interbreeding of individuals of markedly different cell substance stock inheritance. 6. The evidence tends more to support the polygenic theory of the origin of the human species than to support the monogenic theory.

A correct understanding of the obstetric and hematologic findings requires that we view and interpret the findings from a standpoint of natu-

RAE THORNTON LA VAKE *has written numerous articles in his field of obstetrics and gynecology, including several on the toxemias of pregnancy. A graduate of the College of Physicians and Surgeons of Columbia University, he has practiced in Minneapolis since* 1912.

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*Read at the May 3, 1952 meeting of the Minnesota Obstetrical and Gynecological Society at Rochester, Minnesota.

ral sequence of development, rather than from the unnatural standpoint of gross blood transfusion. When, through the phenomenon of agglutination, the blood groups were discovered, and the mechanism of incompatibility described, the terms agglutinogen and agglutinin were suggested by bacteriological concept and nomenclature. However, there was not the slightest suspicion that a toxin antitoxin kinship could exist between the similar phenomena of agglutination in these apparently widely disparate fields. As hematologic knowledge increased, it was found that bloods containing specific isoagglutinins, also gave evidence of containing equally specific isohemolysins and isohemotropins, all of which tended to parallel each other in strength. Still, there was no suspicion that these supposititious entities had any kinship with the agglutinins, lysins and opsonins in bacteriology. They were noted, but it was asserted that if these entities in hematology had any physiological function or biological significance, the latter had yet to be elucidated.

Ever since Levine and Stetson reported the isoimmunization of a mother by the fetus, Landsteiner and Wiener discovered the Rh factor, and Levine, Katzin and Burnham pointed out the causation of erythroblastosis fetalis, many stillbirths and abortions, by the maternal specific antibody isoagglutinin, the generally accepted concept has persisted that we are here witnessing merely the play between the maternal specific isoagglutinin and the fetal agglutinogen. It has been maintained that one cannot interpret these findings as manifestations of a toxin antitoxin mechanism. That to associate the time-honored traditional agglutinogen with a toxic substance, or the time-honored traditional isoagglutinin with a specific antitoxin would be preposterous. The findings in the true toxemias of pregnancy make it seem evident that, contrary to this opinion, the traditional isoagglutinins, isohemolysins, and isohemotropins or isoopsonins, are but suppositious arms of specific antitoxin battalions, and that the cell substances, when acting in a toxic relationship, contain not only corresponding agglutinogens, but corresponding hemolysinogens and hemotropinogens or opsoninogens.

Agglutination, hemolysis, and selective phagocytosis give evidence of being but the visible physical phenomena exhibited by red cells containing a toxic cell substance, in the process of their chemical injury, disintegration, and elimination by the antitoxin specific to the toxic cell substance involved. Agglutination in incompatibility should be interpreted as a necessary predictable result of the toxin antitoxin mechanism. In fact, toxic blood is incompatible only if the serum of the recipient contains either an inherited or actively generated antitoxin specific to the toxic cell substance involved. Thus, it is seen that the physiological function of these specific isoagglutinins, isohemolysins and isohemotropins forming the antitoxin battalions, has been to furnish relative protection to the pregnant woman; and, from a biological standpoint, this toxin antitoxin mechanism, operating since placentate evolution, and conditioned by geographical contiguity of different cell substance stocks, chance mating, and survival factors, has brought about, in every locality, the present day percentages of the blood groups.

The probability of the toxin antitoxin hypothesis was raised to an even higher degree when experiments on venomous snakes showed that when fluid suspensions of the red cells of a venomous snake are attacked by antitoxins specific to the toxic cell substances in its venom, the red cells manifest the same phenomena of agglutination and hemolysis that are manifested by human red cells when attacked by the serum of a woman containing either inherited or actively generated specific antitoxin, and, if the snake is injected with the antitoxin, the snake manifests clinical and pathologic signs of injury and disease analogous to fetal injury from maternal antitoxins, and, the snake may be killed under sufficient dosage, as may the erythroblastotic child by strong maternal antitoxins.

When one approaches the phenomenon of red cell agglutination from the standpoint of the possibility of its being but a visible physical behavior phenomenon resulting from chemical injury, one is led to wonder if we have not been in error in trying to explain the production of agglutination by elaborate conjectures involving physical chemistry. One begins to wonder if the body of the red cell is actually relatively smooth and devoid of surface processes as it appears to be under our highest magnification. When red cells are suspended in solution in a test tube, they tend to maintain a certain distance apart. If the solution is chilled slightly, the red cells are seen to approach one another more closely, at times, so closely as to simulate agglutination. Raise the temperature of the solution by the mere heat of the hand on the test tube, and, upon slight agitation, the cells resume their former distance apart. This behavior suggests that the bodies of the red cells may be covered with yet invisible processes that, in health and under proper temperature, tend to keep the visible bodies at a certain distance apart in fluid suspension. Lower the temperature and these invisible processes shrink, thus allowing the bodies to approach one another more closely. May not agglutination be initiated by this shrinkage under slight injury by the antitoxin, and then, under further injury, surface lesions develop that cause the bodies to stick together? Such behavior would be evinced by larger living cells and organisms with visible surface processes. Physicists would not hesitate to speculate on such a possibility that would, so simply and so well, explain behavior phenomena. Consider what chance there will ever be of actually viewing the Bohr atom. Yet, by assuming this atomic structure, physical phenomena can be logically accounted for. When the electronic microscope was developed, it was hoped that its tremendous power of magnification would throw light on the problem of the surface anatomy of the red cell. Unfortunately, to date, technical difficulties have interfered. It is a problem that warrants further efforts of investigation.

Researches have disclosed that the group cell substances are very stable organic compounds. These substances give evidence of being as fundamental in the physiologic kingdom as are the inorganic minerals in the inorganic kingdom. They can be identified in varying strengths in the cells of the vital organs, as well as in the red cells. Boyd and Boyd, Candela, and Matson have shown that group cell substances may be identified in human remains hundreds of years old. Inorganic minerals in like manner tend to retain their chemical structure. It seems logical to conjecture that, at various stages of the earth's development, organic compounds were laid down that were capable of assuming vital functions, each compound forming the building material of each different living molecule cell or organism. That from then on, the building material of progeny either remained the same by fission, or, inherited only cell substances that existed in at least one of the conjugating cells or organisms, just as in the human it is found that only such cell substances as can be found in at least one parent, can be found in the offspring. It would seem more likely that cell substances have been bred into the species, at some point in its evolution, than that they developed by mutation. That, if, in the past, the offspring of two group O individuals could mutate to a group A or group B offspring, the same mutation should be possible today, and, if so, our law governing the negativing of paternity cannot be valid. Again it would seem highly improbable that the cell substance would mutate to a cell substance that is demonstrably toxic to the cells of such a mother. It would seem that when the same cell substance is found in widely different species, it is more likely that the cell substance was bred into these species by a common ancestral stock, at some point in evolution, than that they arose from a parallel mutation.

The chemical dissimilarities between the various cell substances that permit of their differentiation, furnish a logical explanation of why true toxemias differ in the character of their disease manifestations, and in the sequence of appearance and the progress of these manifestations. But, however their histologic and clinical manifestations may differ, in all true toxemias, no matter what the attacking toxic cell substance, if the antitoxin specific to the cell substance involved is present in the serum of the mother, we find the added pressure and ischemic increase in pathology due to the thromboses in the maternal capillaries caused by the agglutination of fetal red cells that have escaped agglutination at their portals of entry at the breaks in the placental barrier. This accounts for the like, unique pathology seen in the periportal spaces, that has long been considered as pathognomonic of all true pregnancy toxemias.

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1870

One good hospital is a *necessity* in every town of any considerable size; one not belonging to any sect or society for their exclusive use, but supported by the joint efforts of all truly charitable people, and open to all indigent sick; and we feel confident that a little zealous work towards instructing our wealthy citizens as to the demand for such institutions, could not fail to bring about practical and speedy results.

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Venereal Disease Problem Among North American Indians

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Lynwalter[1] reported in 1923 thirty-one per cent positive serologic findings among the Pueblo Indians. Townsend[2] in 1938 stated that the incidence of syphilis revealed by the Wasserman tests done "indiscriminately" was 8 per cent. One thousand four hundred thirty-one Indian men in the state of New Mexico tested from World War II selective service registrants had 5.7 per cent positive serologic findings.[3] Out of 1,174 Zuni Indians tested in New Mexico, 11.4 per cent gave positive serologic reactions, and 1.5 per cent of the 398 Apaches who were examined.[4] The total number of examinations and positive cases found by physicians in the United States Indian Service for fiscal years ending June 30, 1938, 1937 and 1936 respectively are as follows:

TABLE 1

	Total		Syphilis		Other V.D.	
Year	No. of Exam.	Positive Cases	No. of Exam.	Positive Cases	No. of Exam.	Positive Cases
1938	40,151	6,025	29,754	3,830	10,397	2,195
1937	33,349	4,795	23,833	2,674	9,516	2,121
1936	33,001	5,621	24,104	3,337	8,897	2,284

A rough method was arrived at indicating possible trends in venereal disease rates by use of data available from the National Office of Vital Statistics which probably is as close an approximation of the venereal disease problem as can be obtained until further properly controlled surveys and studies are reported.

In 1949, there were 58 deaths from syphilis recorded for Indians or 1.4 per cent of all deaths (4,284) according to NOVS. The comparable figures for the entire United States were 8,581 deaths from syphilis or 0.6 per cent of all deaths (1,443,607).

Acceptable figures are not available on incidence among Indians. An approximation is possible. In 1940, there were six states (Arizona, Montana, Nevada, New Mexico, North Dakota and South Dakota) where the total non-white population was about 85 per cent Indian. Over 40 per cent of the Indian population of the country resided in these states. It is probable, therefore, that the non-white rate for these six states combined is an approximation of the Indian rate. Case rates for venereal disease among whites and non-whites of these six states for 1947-1950 are averaged as follows:

TABLE II

Cause:	Whites	Non-Whites
Syphilis, total	109.4	729.3
Primary and secondary	31.1	213.2
Early latent	27.6	264.1
Late and late latent	42.1	193.8
Congenital	5.8	39.1
State not stated	2.8	19.1
Gonorrhea	91.0	564.7
Chancroid	1.2	6.8
Granuloma inguinale	0.0	0.4
Lymphogranuloma	0.1	1.0

Table III gives rates per 100,000 population based on numbers of cases of venereal disease among whites and non-whites in the six states. You will note that there is a consistently higher rate each year in each category for non-whites than for whites. Over the four-year period, the incidence of primary and secondary syphilis decreased from 44.8 to 19.1 among whites, a decrease of nearly 60 per cent, and among non-whites from 305.5 to 127.7, again about 60 per cent. Incidence of early latent syphilis increased over 50 per cent among whites from 23.9 to 37.0 while for non-whites the increase was only about 30 per cent from 228.1 to 298.6. Late and late latent syphilis among whites increased nearly 30

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[*] Based on a speech delivered by the senior author at the Venereal Disease Seminar held in Denver, Colorado on Sept. 19, 1951.

TABLE III

Cause:	1947 Whites	1947 Non-Whites	1948 Whites	1948 Non-Whites	1949 Whites	1949 Non-Whites	1950 Whites	1950 Non-Whites
Syphilis, total	116.9	805.0	111.8	740.9	99.6	701.9	109.3	669.4
Primary and secondary	44.8	305.5	37.9	243.8	22.6	175.8	19.1	127.7
Early latent	23.9	228.1	22.2	253.7	27.1	275.9	37.0	298.6
Late and late latent	35.7	188.4	43.5	189.7	43.3	208.7	45.9	188.5
Congenital	5.2	31.2	5.6	44.3	5.9	33.3	6.7	47.5
State not stated	7.4	51.8	2.5	9.4	0.8	8.2	0.6	7.1
Gonorrhea	120.9	646.7	102.2	561.6	76.8	520.8	63.9	529.8
Chancroid	1.9	11.6	1.2	6.4	0.9	4.4	0.9	4.8
Granuloma inguinale	0.1	0.0	0.0	0.5	0.0	0.5	0.1	0.5
Lymphogranuloma	0.1	0.3	0.2	2.5	0.1	0.5	0.1	0.5

per cent, from 35.7 to 45.9, while among non-whites the rate in 1947 (188.4) and 1950 (188.5) were approximately the same. The gonorrhea case rate decreased for both groups but in markedly different proportions. Among whites the decrease was nearly 50 per cent, from 120.9 to 63.9, while among non-whites it was about 20 per cent, from 646.7 to 529.8. Cases of the other venereal diseases are too few for special analysis but appear to show about the same pattern.

It can be seen that the data available on venereal disease among the Indians of the United States are not impressive when used to measure the total problem. They have been difficult to secure because of lack of continuity in planning, promulgating and execution of a venereal disease control program. The inability to develop continuity in this field results from the lack of and rapid turnover of qualified health personnel. In 1943, a review of the Bureau of Indian Affairs records showed that the average length of stay of a medical officer in the Indian Service was three years. If the long-term service career physicians were excluded, the average was estimated to be about two years. This condition has not changed but actually was more acute in 1950. As early as May 1, 1939, Dr. John Cowan of North Dakota stated that because of the relatively short office tenure of Indian Service physicians it was difficult to work out a cooperative program and that the state did not receive enough reports to determine the actual incidence of lues among the Indians. There has been a continuous deficit in numbers of medical officers employed in the Indian Service related to requirements. In excess of 200 qualified doctors are needed while positions are available for 145 full-time doctors. Comparable conditions have existed in the categories of the public health nurse and the health educator. The absence of an adequate number of qualified employees in these three categories makes it remarkable that any data are available. In addition to this, the statistical division was abolished in 1948 without concomitant provisions for a substitute source for obtaining Indian health data.

What is the present venereal disease program of the Bureau of Indian Affairs? It consists of 11 different programs fashioned according to the interests of the respective area medical directors, the agency doctors and the state boards of health within which the areas are located. With the rapid turnover of medical officers in the Bureau of Indian Affairs, it is obvious the program is in flux. Generally, it consists of drawing blood on clinic and hospital admissions for serologic study. One area director has identified the venereal disease problem through diagnostic and therapeutic surveys made by teams from the Public Health Service. He has worked out cooperative programs with state and federal agencies and has been responsible for having trained and placed two lay Indian venereal disease investigators. The Public Health Service, at the request of the Bureau of Indian Affairs, completed a venereal disease diagnosis and therapeutic survey of the San Carlos Apache Indians, and on September 24, 1951, will send four teams to the Navajo area with the expectation of examining 25,000 Navajos.

In Alaska the program is primarily planned, promulgated and operated by the Territorial Health Department. In Oklahoma the venereal disease program is completely integrated into that of the state as is true in Nevada through contracts with the Bureau of Indian Affairs for total coverage in the fields of disease prevention and public health.

The Bureau of Indian Affairs now has 11 area medical directors on duty and envisages a continuing expansion of such cooperative programs. Early emphasis on this approach was begun through the letters to the State Boards of Health from the Surgeon General of the United States Public Health Service on May 12, 1939. These letters expressed the desire of Congress that the venereal disease control work be extended to include the Indian population in the several states. All of the Boards of Health replied that the Indians will participate in the state programs on the same basis as other citizens and in many areas received the major portion of the services available to the whole population. There is no assurance, however, that the Bureau of Indian Affairs can carry on a program sharply focused on venereal disease because of the many difficulties mentioned previously. In addition, there is an almost complete lack of basic educational health programs. This will be alleviated somewhat by the appointment of a health educator in the Central Office and two for field work. They will be able to work with the states and federal agencies to bridge across areas where the federal, state and Bureau of Indian Affairs programs do not coincide and help to eliminate duplication of health activities. The states can work with the Indian Bureau personnel as in any other community. This group is resourceful in methods of approach to Indians on health and other matters. Their reservoir of knowledge and information is invaluable in reaction of the Indian groups to health programs and their assistance can be extremely useful in planning and expansions of state programs on the agencies. The rapid shotgun-surefire survey approach is not effective in the long view among the Indians. Intensive basic education must first be in place before optimum effectiveness in venereal disease control can be expected. Mass media and techniques usually applied need modification and in some instances elimination in approach to this minority group. Hand-me-down health procedures are ineffective. The urge to better health must come from the individual Indian and the tribe adjusted to the culture and way of life.

Immediately the Bureau of Indian Affairs must stabilize the tenure of employment of its health personnel to obtain adequate reporting of morbidity and mortality. If this is possible, case finding, case holding, case treatment and case follow-up can be carried on with currently accepted practices. It must follow through on its avowed policy of transferring all disease preventive and public health activities to the states requesting funds for this purpose on a continuing basis as long as the need can be demonstrated and the services can be rendered.

The program will require cooperative surveys by the states and the Public Health Service to determine the venereal disease problem. The health education resources of the states will be needed on a continuing basis. Until the states take over the responsibility for the total disease preventive and public health programs for the Indians, the health personnel and the Indian will continue to use every known tool emphasizing health education and the use of lay Indian health assistants to prevent and to control venereal disease. They will look to their respective states for guidance and assistance to obtain eventual complete integration of the Bureau of Indian Affairs venereal disease control program into that of the state and nation.

In conclusion, it should be noted that adequate morbidity and mortality rates have not been available on an overall continuing basis but have for the most part been based on blood serologic studies not adequately controlled and less than acceptable documents of cause of death.

The lack of stability of personnel tenure in the Bureau of Indian Affairs has adversely affected the control program.

The Public Health Service has and is conducting case finding surveys simultaneously using prophylactic and curative measures to the Indians on the same basis as other citizens.

The reported venereal disease rates among Indians indicate need for increasing state control and treatment methods within the agencies and among Indians and non-Indians to avoid the so-called "ping pong" effect of one-sided control measures that recognize legal barriers not observed by the spirochetes or gonococci.

It should be recognized that the states must assume complete responsibility for the public health program for the entire state population including the Indians with potential and actual assistance to be provided by the Bureau of Indian Affairs, where need can be demonstrated and where services can be acceptably rendered.

Finally the venereal disease control program must be considered and operated as a part of the whole public health and disease prevention program of the Indians properly related to their other health and disease problems.

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Progress in Insulin Physiology*

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When Claude Bernard,[1] by directing a puncture toward the floor of the fourth ventricle, produced temporary hyperglycemia and glucosuria in experimental animals, he demonstrated the presence of certain tracts or centers of the brain influencing carbohydrate metabolism. Corresponding centers have been located in the hypothalamus, adjacent to the pituitary gland and apparently in the pons. It remained, however, for von Mehring and Minkowsky[2] to produce permanent diabetes mellitus by complete removal of the pancreas. Here the predominant role of the pancreas was traced to its endocrine islands discovered by Langerhans in 1869.[3] Several types of island cells are now recognized, the most important of which are the alpha and beta cells. The beta cells are the producers of insulin and it has been shown that these are the ones destroyed in almost all cases of experimental and human diabetes.

The preparation of crystalline insulin by Abel[4] greatly facilitated the study of this hormone. It is a protein with a labile disulfide linkage due to the cystine content. The maximum molecular weight is 48,000 which is subject to reversible dissociation into sub-units of M.W. 12,000. These findings and the fact that high physiological efficiency of insulin is not bound to the crystalline structure suggest that lower aggregates, down to M.W. 12,000, are physiologically active. A natural delayed action insulin of M.W. 18,000, assumedly a combination of insulin, M.W. 12,000, with a "basic protein" of M.W. 6,000, has been extracted directly from the pancreas (Lindner's nativ-insulin[5]).

The important effects of insulin in vivo include: (a) the promotion of the oxidation of glucose by the tissues and corresponding reduction of the blood sugar level, (b) deposition of glycogen in the liver and the musculature, (c) the inhibition of sugar formation from proteins and partly from fat in the liver and (d) the promotion of the deposition of fat obtained from dietary glucose and the prevention of ketosis. In the normal animal extraneous insulin may cause a fall in liver glycogen. This effect is attributed to the physiological priority of the musculature for available glucose after accelerated metabolism of glucose and secondary hypoglycemia which, in turn, causes glycogenolysis in the liver. Metabolic studies using isotope technique have further revealed that in normal rats ten times as much ingested glucose is transformed into fat as into glycogen.[6] These findings, confirming previous doubts which were based on the calculation of energy requirements for prolonged physical exercise, have greatly shaken the traditional concept of the role of glycogen as the eminent reserve fuel of the body in energy production.

Clinicians treating diabetes mellitus have been disturbed by the fact that no constant ratio could be established between the insulin unit and the amount of glucose utilized. It was found that when the total caloric content of the diet (from carbohydrate, protein and fat) was kept constant and the protein content not changed, the insulin requirement stayed about the same, although the relative proportions of carbohydrate and fat were greatly varied.[7] This casts doubt upon the validity of the hitherto recognized equation for the calculation of dietary glucose equivalents, namely: $1.0 \times \text{carbohydrate} + 0.58 \times \text{protein} + 0.10 \times \text{fat} = \text{total glucose equivalent}$.

In the above equation the 10 per cent conversion rate of fat corresponds to its average glycerol content before hydrolysis. In order to maintain the basic concept of insulin physiology —utilization of dietary and intermediary glucose—it is necessary to concede a larger role than was formerly admitted to the intermediary conversion of fat to glucose. While this view has been favored for several reasons by a number of clinicians and physiologists, general recognition of its importance was delayed for lack of de-

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* Presented in Clinical Conference on Nov. 8, 1951.

tailed proof. Metabolic tracer studies of recent years utilizing carbon isotopes have shown that fatty acids with 2 and 4 carbon atoms can be converted to glycogen, i. e., potential glucose.[8] As, on the other hand, the physiological breakdown of the longer fatty acid chains of the natural fats to aliphatic acids with 2 and 4 carbon atoms has been accepted in principle since Knoop,[9] and in more detail in recent years, the theoretical gap between these two important problems is being bridged. Consequently the conversion of C^{14}-labeled palmitic acid, analogous to the one occurring in natural fats, to glucose was demonstrated recently with a significant rise in diabetic animals.[10]

Claude Bernard's old observations on neural regulation were supplemented by Houssay's discovery that hypophysectomized animals are extremely sensitive to insulin and subject to spontaneous hypoglycemic convulsions when fasting. Also the diabetes mellitus of pancreatectomized animals is considerably ameliorated after hypophysectomy.[11] Intact animals have been made permanently diabetic by repeated injections of anterior pituitary extract with resulting degeneration of the beta cells of Langerhans' islands.[12,13] Studies on partially depancreatized cats which had been made diabetic by A-P-E injections showed that, in the early stages, A-P-E induced beta cell degeneration and diabetes can be reversed by treatment with diet or insulin.[14] Recently diabetogenic activities of the growth hormone fraction of the interior pituitary of ACTH, and of the adrenal steroids have received special attention. These substances appear to produce an excessive gluconeogenesis in the liver, resulting in continued hyperglycemia, which places an overburden on the beta cells and leads to their exhaustion and final degeneration. Similar effects have been produced by continued intraperitoneal injections of glucose alone.[15]

Destruction of the beta cells with permanent diabetes can be produced quickly by the intravenous injection of alloxan which is an oxidation product of uric acid. This has led to speculation about the role of uric acid or other purine metabolites in the etiology of clinical diabetes.

The basic mechanism of the action of insulin is still disputed. The phosphorylation of glucose to glucose-6-phosphate is a prerequisite both for its subsequent oxidation or its transformation to glycogen. This phosphorylation is catalyzed by the enzyme hexokinase. According to one theory[16] this catalysis is inhibited by anterior pituitary hormone and this inhibition is released by insulin. The more recent theory of Levine in 1949[17] is that insulin accelerates the entry of glucose into the tissue cells, and that this is the primary cause of the increased utilization of glucose. The latter theory takes into account the fact that Houssay's hypophysectomized and pancreatectomized dogs, while mildly diabetic, can survive up to nine months, utilizing glucose without the help of insulin.

Not long after the discovery of insulin, when commercial preparations were used, a short lasting initial hyperglycemic action of the hormone was noted on intravenous injection but not after subcutaneous administration. Crystalline insulin, prepared according to Abel's method, was free of this hyperglycemic factor. Systematic fractionation of commercial insulins by Bürger[18a] and more recently by Sutherland[19] led to the isolation of minute amounts of protein-like substance which causes this hyperglycemia by mobilizing hepatic glycogen (Bürger's glukagon; hyperglycemic-glycogenolytic factor in the United States). The origin of this substance has been traced to the alpha cells of Langerhans' islands (Ferner's silver cells). Certain evidence has been submitted that glukagon circulates in the blood[18b] and the substance has been declared by some to be a true alpha cell hormone and a physiological synergist of insulin, insofar as the alpha cell hormone causes glycogenolysis in the liver and the glucose thus mobilized is utilized by secondary insulin action. The existence of an alpha cell hormone has also been assumed because animals made diabetic with A-P-E or alloxan (with their alpha cells surviving) were found to have a higher insulin requirement than those which had their pancreas removed entirely. Furthermore patients who have undergone pancreatectomy have a remarkably low insulin requirement, much less than that of many spontaneously diabetic patients.

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(Continued on page 544)

Current Trends in Vital Statistics Registration*

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There has been a marked reduction in infant mortality over the past few decades, but this achievement has been greater in the group surviving the first few days of life than among the newborn. In recent years, a major portion of infant deaths have occurred shortly after birth. Important as these reductions are, it has become increasingly clear that the saving of lives lost after birth is only part of the problem. There is need for intensified investigation of fetal deaths and of factors related to immaturity, the condition associated with most of the deaths in early infancy.

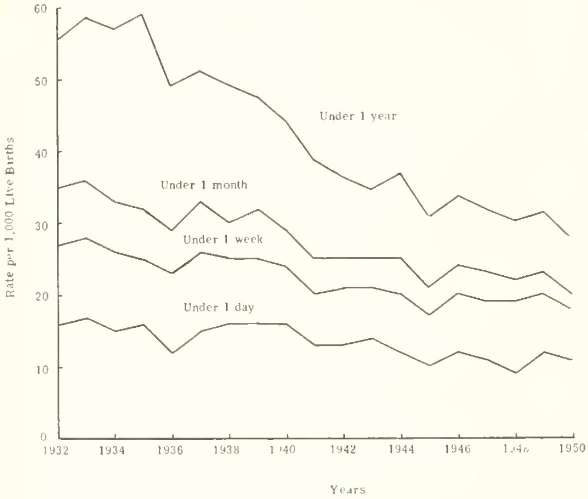

Fig. 1. Infant death rates per 1,000 live births by age groups, North Dakota, 1932-1950.

Statistical data serves in the initial phase of defining the extent of the problem in order to establish an effective program; however, differences in definition and in registration practices have made it impossible to obtain comparable facts regarding live births and fetal deaths. In the case of fetal deaths, statistics are generally available for deaths only in the late fetal period (previously called stillbirths) which have been defined in various ways. This lack of uniformity has been a problem nationally as well as internationally.

Development of international recommendations:

Proposals for international adoption of definitions were made in 1948 at the International Conference for the Sixth Decennial Revision of the International Lists of Diseases and Causes of Death. No agreement was reached except to refer the matter to the World Health Organization Expert Committee on Health Statistics. The Conference also recommended that the problem of obtaining reliable statistics on fetal deaths be studied by the United States and the United Kingdom.[1]

One of the first actions of the United States National Committee on Vital and Health Statistics after its establishments by the Surgeon General in 1949 was to study the definition of fetal death.[2] A subcommittee composed of leading obstetricians, clinicians, a fetal pathologist, and a statistician developed definitions of fetal death and of live birth. Also participating in the discussion were representatives from Canada and the United Kingdom, the latter acting for WHO. After a number of referrals and modifications, in May 1950 the Third World Health Assembly recommended to its member nations the adoption of the new definitions of fetal death and live birth.

Definitions recommended:

The definition of live birth and live born is as follows:

> "Live birth is the complete expulsion or extraction from its mother of a product of conception, irrespective of the duration of pregnancy, which, after such separation, breathes or shows any other evidence of life such as beating of the heart, pulsation of the umbilical cord, or definite movement of the voluntary muscles, whether

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or not the umbilical cord has been cut or the placenta is attached; each product of such birth is considered live born." Because the French language has no word corresponding to the English term "live birth," the definition was made to cover both "live birth" and "live born."

This definition differs from the one appearing in the "Physicians' Handbook on Death and Birth Registration, 1939"[3] mainly because of the addition of the phrases "irrespective of the duration of pregnancy" and "pulsation of the umbilical cord." The North Dakota Division of Vital Statistics has used the definition appearing in this and subsequent handbooks[4,5] for many years in an effort to secure complete registration of all live births.

The definition of fetal death is the converse of the definition of live birth and is as follows:

"Fetal death is death prior to complete expulsion or extraction from its mother of a product of conception, irrespective of the duration of pregnancy; the death is indicated by the fact that after such separation, the fetus does not breathe or show any other evidence of life such as the beating of the heart, pulsation of the umbilical cord, or definite movement of voluntary muscles."

The North Dakota law relative to the registration of stillbirths does not specify the period of gestation at which reporting is required, but as a matter of policy since approximately 1940, the definition appearing in the Physicians' Handbook has been followed, namely, registration if 20th week of gestation has been reached.

Significance of the new definitions:

Present statistics on fetal deaths are extremely limited for a number of reasons. There has been lack of international comparability in the minimum period of gestation after which a stillbirth or stillborn must be reported. In England, Wales, Canada, Sweden, and New Zealand, for example, it must be reported after the twenty-eighth week; in Switzerland and Finland after the sixth month of pregnancy; Czechoslovakia at the end of the twenty-sixth week; Norway after the eighth month; and Japan after four months.[6]

In some countries a child born alive but dying within the period of registration is considered as stillborn; the period may vary from 1 to 6 days after the birth of the child. There are also variations in what is considered "evidence of life." Use of the terms "abortion," "miscarriage," "stillbirth," and "fetal death" interchangeably has also added to the confusion.

Within the United States, laws of different states vary a great deal in their respective definitions, only about half in agreement with the Model Vital Statistics Act recommendation of "after at least twenty weeks of gestation in which the child shows no evidence of life after complete birth."

Adoption of the new definition of fetal death will permit international comparison of statistics, will give greater uniformity and improvement in registration procedures, and greater accuracy of natality and mortality statistics. It will provide information needed for medical and social study of pregnancy wastage and causes of fetal deaths, and will be of value to clinicians as well as to health authorities.

The proposed definition of live birth will not add new knowledge on the subject of fertility in the United States. However, it does tighten up the definition, leaves less room for differences in interpretation, and will result in greater uniformity in studies of neonatal mortality.

It will be sometime before the new definitions can be translated into more complete and useful statistics. In the United States it will be necessary to amend many state laws and health regulations now defining live birth and "stillbirth" and the registration requirements pertaining thereto. At present there is a lack of uniformity in the state laws, and only New York City requires the registration of fetal deaths of less than 20 weeks gestation. The ultimate goal of the recommendations is to have every identifiable fetal death reported. The practical problems related to registration or reporting of all dead fetuses will take many years to resolve.

Endorsement of definitions:

The new definitions have already been endorsed by the Association of State and Territorial Health Officers, American Public Health Association, American Academy of Pediatrics, American Committee on Maternal Welfare, American Medical Association, and the Public Health Conference on Records and Statistics. Support for the definitions is being sought from the various hospital and medical groups.

Prematurely born infants:

Information concerning the incidence of immaturity and mortality in the prematurely born group has been limited mainly to the findings of special studies by individual hospitals and a number of city and state departments of health.

The development of effective national, state, and local health programs directed at the prematurity problem requires similar data for all parts of the country. With the addition of birth weight and weeks of gestation items to practically all state certificates of birth during 1949, such a broad statistics program has become feasible for the first time. Combining data from matched birth and death records will provide information needed to determine the relative chances of survival in various birth weight groups and the changes that occur in the mortality rates.

The usefulness of statistics on immaturity (prematurely born infants) for national and state planning depends to a great extent on the comparability of the data collected and tabulated.

Immature (premature) infant defined:

At a Round Table Discussion on Prematurity at the Fifth Annual Meeting of the American Academy of Pediatrics held in New York City in June 1935, the following resolution was passed:[7]

> "For statistical purposes and comparison of results of care, a uniform standard for diagnosis of prematurity is important; a premature infant is one who weighs 2,500 grams or less at birth (not at admission) regardless of the period of gestation; all liveborn premature infants should be included, evidence of life being heart beating or breathing; * * *."

In most of the literature published since that date, this definition has been followed.

Clearcut distinctions have been observed with regard to sex, race, and plurality as they affect weight at birth, but it is essential that the dividing line of weight be rigidly adhered to in reports and tabulations if the experiences of institutions and agencies are to be compared.

The International Statistical Classification of Diseases, Injuries and Causes of Death defines an immature infant as a liveborn infant with a birth weight of 5½ pounds (2,500 grams) or less, or specified as "immature." If weight is not specified, a liveborn infant with a period of gestation of less than 37 weeks or specified as "premature" may be considered as the equivalent of an immature infant for purposes of this classification.[8] The use of gestation information as a substitute for birth weight is aimed at assisting in the certification and classification of causes of death among the newborn. The number of weeks refers to completed weeks measured from the first day of the last menstrual period.[9]

Inaccuracies in gestational information derived from birth records:

At the present time, important inaccuracies are evident in gestational information derived from birth records. These arise principally from difficulties in computing "length of pregnancy" in weeks, and are reflected in the statistics by extreme heaping at 36 and 40 weeks, and a minor bias toward other even weeks. The heaping at 36 weeks is the result of incorrectly converting 9 calendar months into weeks by considering 4 weeks the equivalent of a month. Heavy concentration at 40 weeks is indicative in part of a failure to calculate period of gestation for the newborn infants who seem to be normally developed.

How many premature births in North Dakota?

The North Dakota Division of Vital Statistics has recently reviewed the 17,160 birth records filed for the calendar year 1950,[10] which illustrates the heavy concentration mentioned in the previous paragraph. For example, in the group of babies stated on the birth certificate to have been of 36 weeks gestation or less and which weighed 5 pounds 9 ounces or more—there were a total of 2,174 single live births and 46 individual babies of plural sets. Eight babies stated to have been of 36 weeks gestation weighed 11 pounds and 1 ounce or more! This points up the serious error in attempting to use only the gestation period as stated on the birth record as a criterion for determining prematurity.

The attending physician is legally responsible for completing and filing the birth certificate, but in most cases the physician undoubtedly leaves the preparation of the record to his office nurse or the record clerk or nurse in the hospital. It would seem apparent from reviewing the certificates that the person preparing the records should be instructed in the importance of computing the weeks of gestation as accurately as possible. For statistical purposes, the period of gestation is defined as "the number of completed weeks that have elapsed between the first day of the last menstrual period and the date of birth of the child." It is recognized that there are cases where the exact date of the mother's last menstrual period cannot be determined accurately. However, the bias introduced by such errors will be relatively minor. From a statistical standpoint, the important factor is the consistent application of the definition on the basis of the best available evidence.

More accurate birth weight data needed:

Because of the necessity of placing more reliance on birth weight data in proposed studies of prematurely born infants, it is essential that birth weight be reported accurately for all newborn infants including the very small and those who die soon after birth. Accurate and consistent measurement and reporting of birth weight requires that:

1. The baby should be weighed immediately after delivery
2. The scale should be balanced before each weighing
3. Allowance should be made for any covering on the child or clamp on cord

4. The birth weight should be noted and recorded to the nearest ounce or 10 grams. (Do not round weights to the nearest pound or half pound)
5. Accuracy of scales used in hospitals to weigh the newborn should be checked at intervals

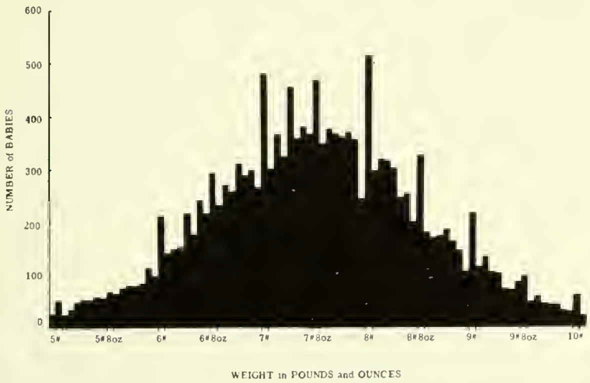

Fig. 2. Number of babies born in North Dakota according to weight, 1950 (includes those between 5 and 10 pounds only).

Figure 2 illustrates the heavy concentration of weight around nearest pound and half pound of babies recorded in North Dakota for the calendar year of 1950.

Failure to report birth weight on the birth certificates for even a small proportion of births can seriously distort data on the incidence of immaturity and the mortality of infants in low weight groups.

Neonatal mortality

An important bias in the data on immaturity and neonatal mortality could result from failure of attendants to prepare birth and death certificates for infants who die immediately after birth. The cooperation of every attendant is needed in the filing of a live birth certificate for every product of conception meeting the definition of a live birth. A birth certificate should be filed even in those cases where there is no possibility of survival. If the infant dies anytime following birth, a death certificate should also be completed.

Because the infant mortality rate changes sharply at the early ages, it is important to have the age of the infant recorded accurately on the death certificate. Age on the death certificate should be reported in "hours" for infants under 1 day of age, in "days" for infants under 1 month of age, and in "months" for those over a month and under 1 year of age. In some cases, it is evident that the stated age of the infant is inconsistent with the date of birth as given on the death certificate, and even on the birth certificate.

Care needed in completing medical certification of cause of death:

In the case of an infant, the cause of death is often difficult to determine. However, all too frequently vague or ill-defined terms are reported on the medical certification. Such terms as "congenital debility" or "weakness," "immaturity," and "prematurity" are not in themselves acceptable causes of death.

Coding methods of the Sixth Revision of the International List of Diseases and Causes of Death identify prematurity in relation to certain specific causes of death under one year of age, and the deaths due to prematurity alone.

Of the 338 neonatal deaths (deaths under 30 days of age) for 1950, birth records were found for 336 infants. Of these birth records, 64 per cent (215) showed a birth weight of 5 pounds 8 ounces or less (or were considered as premature as defined earlier in this paper). Ninety-one per cent (or 196) of the 215 deaths fell into statistical classifications in which prematurity is a part of the cause of death classifications, but 9 per cent of these death records made no mention of prematurity in the medical certification of cause of death, yet the birth record indicated a weight of 5 pounds 8 ounces or less.

Birth records for 103 of the 336 matched records showed a birth weight of 5 pounds 9 ounces or more, yet on 2 death records "prematurity" was given as the only cause of death, and 2 others mentioned prematurity in connection with another cause. No birth weight was given on 18 of the birth records, but 5 indicated a 38 or 40 weeks gestation period, and on the corresponding death certificates for these 5 infants, "prematurity" was the only cause given on 2 records and prematurity was also mentioned in the cause of death on 2 others.

These figures are cited merely as a reminder that in order to properly study the survival rates of immature children, it is necessary that the data used in the studies be as reliable as possible. The statistics derived can only be as good as the documents from which they are obtained!

SUMMARY

This paper has reviewed the need and development of international recommendations relating to definitions of "live birth and live born," of "fetal death," and the significance of these definitions; the statistical definition of an immature (or prematurely born) infant, the inaccuracies in gestational information as derived from current birth records, the need for placing more reliance on birth weight data in proposed studies

(Continued on page 544)

Lancet CLINICAL REVIEWS

This department of The Journal-Lancet *is devoted to reports on cases in which all the appropriate diagnostic criteria have been employed, the best known treatment administered and the results recorded. It is desired that these case reports be so prepared that they may be read with profit by physicians in general practice, hospital residents and interns and may be of considerable value to junior and senior students of medicine. This department welcomes such reports from individuals or groups of physicians who have suitable cases which they desire to present.*

Clinicopathological Conference

Minneapolis Veterans Hospital*

Edited by James F. Hammarsten, m.d.
Assisted by N. L. Gault, m.d. *and* Donald Fry, m.d.

PRESENTATION OF CASE

First Admission (April 17, 1947): A 49-year-old janitor was admitted to this hospital because of fatigue, jaundice and pruritus.

In December 1942 he received yellow fever vaccine. In the spring of 1943, while in North Africa, he developed weakness, fatty food intolerance, and vomiting. He had been taking atabrine prophylactically. He continued to work until September 1943 when he was hospitalized after his legs became swollen and his skin yellow. The ankle edema subsided and he was discharged after several weeks.

He was admitted to another Army hospital on February 15, 1944 with the complaint of intolerance to fatty foods. The physical examination at that time was negative. The bromsulphalein retention was 18 per cent in 30 minutes after the injection of 2 mg. of dye per kilogram of body weight. The serum protein varied from 6 to 7 gm. per 100 ml. with an albumin-globulin ratio of .6 to .8. Other laboratory tests, including hippuric acid, galactose tolerance and icteric index, were all normal. A cholecystogram showed a non-functioning gallbladder. He was given a medical discharge from the Army on April 15, 1944.

In the subsequent three years he had several episodes of jaundice, dark urine, clay-colored stools, and pruritus. He continued to have fatty food intolerance.

In 1919 he had gonorrhea and syphilis. He had intermittent treatment until 1926 when central nervous system syphilis was diagnosed. For the next ten years he had intensive antiluetic therapy.

He denied the use of alcoholic beverages.

Physical examination showed a chronically ill icteric man. The liver and spleen were both palpable two finger breadths below the costal margin. Numerous spider nevi were present on the face and shoulders. The right testicle was atrophic. The left pupil was irregular and reacted sluggishly to light, but the remainder of the neurological examination was negative.

The admission hemogram revealed a hemoglobin of 15.0 gm. per 100 ml., and a white blood cell count of 5,050 per mm,^{3} with 52 per cent neutrophils, 42 per cent lymphocytes, 3 per cent monocytes, and 3 per cent eosinophils. The erythrocyte sedimentation rate was 30 mm. in one hour. The urine showed a trace of albumin but was normal in other respects. A blood Kahn was negative.

The serum protein was 8.8 gm. per 100 ml. with 5.1 gm. albumin and 3.7 gm. globulin. The blood glucose was 88 mg. per 100 ml. The serum bilirubin was 3.4 mg. per 100 ml. in 1 minute and 7.8 mg. total, the thymal turbidity 10 units, the cephalin flocculation 3 plus in 24 hours and 48 hours, the bromsulfalein retention was 44 per cent (uncorrected) in 45 minutes; the urine urobilinogen 8 Ehrlich units in 2 hours; the serum cholesterol 225 mg. per 100 ml. with 139 mg. in the esterified fraction, the alkaline phosphatase 8 King-Armstrong units; the prothrombin time 15.8 seconds with a control of 12.8 seconds.

X-ray films of the chest and a cholecystogram were normal.

A liver biopsy revealed disruption of the hepatic architecture, increase in the portal connective tissue, moderate infiltration of the portal spaces by lymphocytes, and mild fatty changes.

He improved and the jaundice disappeared. The erythrocyte sedimentation rate decreased to 4 mm. in 1 hour. The liver function studies also showed improvement. The serum bilirubin and urine urobilinogen became normal. The bromsulfalein retention decreased to 20 per cent and the cephalin flocculation decreased to 1 plus in 24 hours and 2 plus in 48.

He was discharged August 29, 1947.

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*Published with approval of Chief Medical Director. The statements and conclusions published by the authors are the result of their own study and do not necessarily reflect the opinion or policy of the Veterans Administration.

Second through sixth admission (February 25, 1948 through January 5, 1950): He continued to have fatty food intolerance and fatigue. Occasionally mild ankle edema was noted after exertion. The physical findings were unchanged. An esophogram showed changes consistent with esophageal varices. The prothrombin time was consistently prolonged (18.2 seconds with a control of 13 seconds) and did not respond to the administration of vitamin K. Additional liver function studies were performed in January 1949. The intravenous galactose tolerance test showed 88 mg. per 100 ml. in 1 hour, the hippuric acid test showed .82 gm. excreted in 1 hour, the 24 hour urine coproporphyrin excretion was 192 gamma, and the 24 hour urine urobilinogen excretion was 3.8 mg.

Final admission (September 11, 1951): He was followed in the out-patient clinic, and in August 1951 he complained of severe pain in the left upper quadrant and left lower chest. The pain was aggravated by deep inspiration and walking. An x-ray film of the chest showed two discrete nodules in the right lung (see figure 1). He was referred to the hospital for admission.

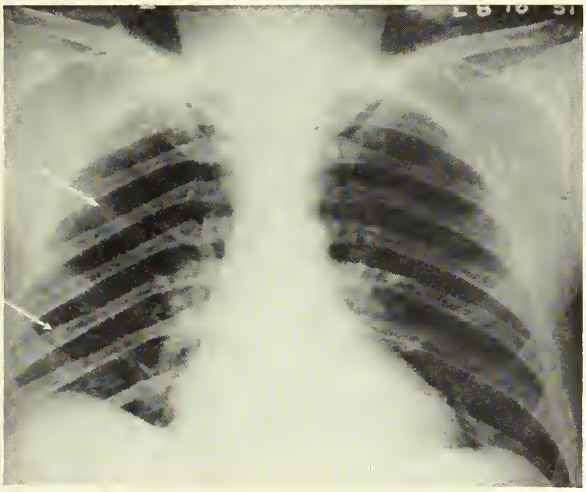

Fig. 1. X-ray film of the chest, showing two discrete nodules in the right lung.

Physical examination showed an acutely ill man. Spider nevi were more numerous. There were sticky rales at both bases. The abdomen was markedly distended. In the epigastrium there was a grapefruit-sized hard mass inseparable from the liver. There was generalized upper abdominal tenderness. Mild ankle edema was noted and the temperature was 100° F.

The hemoglobin was 15.1 gm. per 100 ml., and the white blood cell count 5,100 per mm.^{3} with 83 per cent neutrophils, 13 per cent lymphocytes, 1 per cent monocytes, 1 per cent eosinophils, and 2 per cent basophils. The erythrocyte sedimentation rate was 27 mm. in 1 hour.

The serum bilirubin was 1.1 mg. per 100 ml. in 1 minute and 3.0 mg. total. The thymal turbidity was 8.3 units and the cephalin flocculation 4 plus in 24 and 48 hours. The bromsulfalein retention was 42.5 per cent (corrected) in 45 minutes. The serum protein was 9.1 gm. per 100 ml. with 5.5 gm. albumin and 3.6 gm. globulin. The alkaline phosphatase was 41 King-Armstrong units. Stools were negative for occult blood. A serum amylase was 40 units.

The initial x-ray film of the chest showed multiple nodular lesions in both lungs (see figure 2). Studies after a barium meal and barium enema were normal.

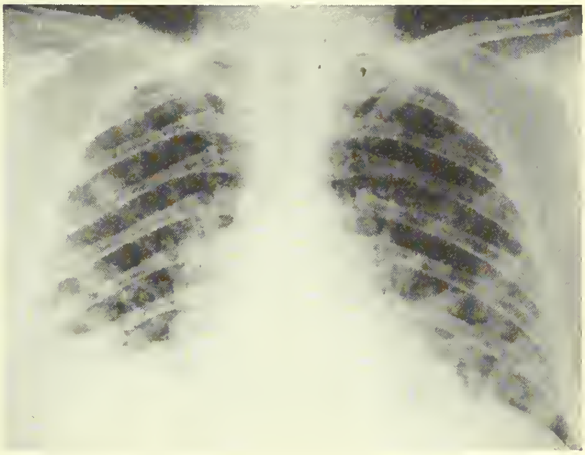

Fig. 2. X-ray film of the chest showing multiple nodular lesions in both lungs.

The pain became more diffuse and involved the lower chest and upper abdomen. Narcotics were required for relief. He was febrile with a temperature of up to 100° F. almost every day. Jaundice became apparent. The erythrocyte sedimentation rate increased to 70 mm. in 1 hour and the hemoglobin decreased to 12.8 gm. per 100 ml. The serum bilirubin increased to 11.1 mg. per 100 ml. in 1 minute and 20.0 mg. total. X-ray films of the chest showed a progressive increase in the size and number of the nodular lesions.

The pain increased in severity. He gradually became weaker and more somnolent, and died on October 12, 1951.

DISCUSSION

DR. C. J. WATSON*: This patient had repeated attacks of jaundice. The first episode was associated with swelling of the legs. I have seen several cases of acute hepatitis in which edema and ascites occurred early. That has also been observed by others. The fact that he had fairly marked jaundice with swelling of the legs indicates a diffuse liver disease, which could very well have been chronic hepatitis resulting from yellow fever vaccine. The jaundice appeared at the characteristic time, 90 days, after the vaccination.

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*Professor of medicine, University of Minnesota, Minneapolis, Minnesota.

The recurrent episodes of jaundice with pruritus could be on the basis of a common duct stone. However, I have seen the same thing with hepatitis. It is not uncommon to have pruritus with hepatitis. Relatively pure cholangiolitic hepatitis, in which the liver cell function is comparatively good, may present the picture of obstructive jaundice but have no extrahepatic obstruction.

The development of numerous spider nevi is a strong point in favor of diffuse disease of the liver. Numerous spider nevi would favor the diagnosis of cirrhosis following hepatitis rather than obstructive biliary cirrhosis. The only instances I have seen of biliary tract obstruction with cirrhosis and a few spider nevi were patients who had persistent jaundice for a long time.

On the first admission the alkaline phosphatase is low, 8 King-Armstrong units, when the 1 minute serum bilirubin is 3.4 mg. The failure of the alkaline phosphatase to rise along with the prompt reacting bilirubin is a point in favor of a diffuse disease of the liver. Shortly before he died the prompt reacting serum bilirubin is down to 1.1 mg., but the alkaline phosphatase has reached 41. We cannot explain that last rise in the phosphatase on the basis of just regurgitation jaundice. I will leave that for a minute before trying to interpret it.

There is definite evidence of cirrhosis on biopsy. It is a non-fatty type of cirrhosis and is obviously not the kind of cirrhosis that occurs in a chronic alcoholic. I suppose some people would term it a post-necrotic cirrhosis. I think it is a progressive cirrhosis and that the repeated episodes of jaundice are evidences of recurrent liver injury.

He developed signs consistent with esophageal varices. The only time I have seen esophageal varices develop in a patient on the basis of biliary obstruction is where the obstruction was persistent and prolonged. Splenomegaly also does not occur unless obstruction has led to biliary cirrhosis.

In August the picture changes. Something has been added. He develops severe pain in the left upper quadrant, metastatic nodules in the lung, and a large hard mass in the liver.

I would like to return again to the elevated alkaline phosphatase. That is best explained on the basis of a neoplasm. I have seen it frequently in patients with hepatomas. It is not, however, specific for hepatoma. I have seen it in association with Hodgkin's disease involving the liver and in metastatic tumors of the liver.

The alkaline phosphatase in the patient being discussed today has gone up while the jaundice diminished. A hepatoma can also explain the pain. A hepatoma may metastasize almost anywhere. It may invade the hepatic vein and lead to tumor emboli to the lungs.

I would like to discuss briefly the use of the term "post-necrotic cirrhosis." Some people who use that term believe that a single insult occurs, such as a severe hepatitis. The patient recovers but marked scarring remains. The patient then continues in a static condition. It doesn't appear to me to be that way. The cases I have seen with irregular nodular cirrhosis often do not have a severe attack at the onset, but may start with a mild episode and go on to progressive disease, perhaps remitting at times. I think there is too much belief in socalled post-necrotic cirrhosis as a strict entity and a static disease.

I think this man had cirrhosis of the liver secondary to homologous serum hepatitis and a hepatoma.

DR. HELLER: What is the cause of the elevated alkaline phosphatase?

DR. WATSON: I think that phosphatase is produced in the liver and that minor irritations will cause elevations of the phosphatase. There is a lot to suggest that cholangiolar epithelium is important in the production of phosphatase. In tumors, especially hepatomas, I believe the tumor can produce phosphatase in excess. A relatively normal liver cell integrity is necessary to get an elevated alkaline phosphatase. The patients with the most severely damaged livers have a low phosphatase.

DIAGNOSES

Clinical diagnosis: Cirrhosis. Hepatoma.

DR. WATSON'S DIAGNOSIS: Cirrhosis secondary to homologous serum hepatitis. Hepatoma.

Anatomical diagnosis: Cirrhosis. Hepatoma.

PATHOLOGICAL DISCUSSION

DR. GLEASON: The lungs contained numerous tumor nodules. The liver showed a nodular cirrhosis. There were two large tumor masses in the right lobe of the liver and several smaller tumor nodules scattered throughout the liver. Tumor was also found in the mesenteric and hilar lymph nodes. On microscopical section the liver showed tremendous scarring. Tumor was present in almost every section of the liver. The tumor resembled liver parenchyma very closely.

Section on PAIN

"For all the happiness mankind can gain
Is not in pleasure, but in rest from pain."
—John Dryden

Nothing in life's experiences is more appreciated than relief from pain, whether it be caused by conditions quickly remedial or by those for which there is no cure, such as inoperable malignancy. It is pain which probably more often than any other symptom causes individuals to first seek medical aid. It is the relief from pain which gains the confidence of these individuals. Thus the physician has a vast opportunity to serve humanity.

Such rapid progress is being made in almost every phase of medicine and surgery as to necessitate frequent presentations of new methods, reviews, summaries and evaluations of both old and new procedures. Available information concerning pain is so important to physicians that Dr. John S. Lundy was invited to plan and edit a special issue of The Journal-Lancet *on this subject. This appeared in February 1952 and was one of the most popular issues in the journal's 83 years. In fact, it elicited so many inquiries and so much favorable comment as to be obvious that the subject clearly deserves frequent consideration.* The Journal-Lancet *takes extreme pleasure in announcing that John S. Lundy, of the Mayo Clinic, has consented to accept the editorship of a special section on pain, beginning with this issue.*

J. A. Myers, M.D.

Treatment of Painful Neuralgias of the Head

GEORGE S. BAKER, M.D.
Rochester, Minnesota

The most excruciating pain that mankind has been forced to tolerate over the centuries has been that experienced in trigeminal neuralgia (tic douloureux). Of the various body pains it would appear that pain originating in the fifth or ninth cranial nerves is the most unbearable. The patient who is afflicted with one of the major neuralgias of the face will invariably seek out a physician for relief of pain. The pain experienced when a dental drill damages a small filament of a dental nerve is minor compared to the situation when all the teeth on one side become electrified. Great advances in the control of various painful conditions have been made in the past twenty-five years and among the outstanding contributions has been improvement in the treatment of the severe neuralgias of the head.

Although the term "neuralgia" has been used by physicians for centuries it is well to define it and to differentiate it from neuritis before proceeding with this discussion. Neuralgia is a sharp intermittent pain in the distribution of a given nerve that occurs without apparent cause. The idiopathic nature of the disease is not an essential part of the definition at present. Often, in a case of sharp intermittent pain in the distribution of a nerve, careful neurologic or anatomic study may suggest the presence of some organic lesion or inflammation, or perhaps a metabolic, vascular, toxic or structural defect. Aneurysms, localized infections and tumors have been described repeatedly as etiologic factors

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GEORGE STANSBURY BAKER *is assistant professor of neurosurgery at the Mayo Foundation, University of Minnesota. A graduate of the University of Maryland in 1933, Dr. Baker took graduate training at the University hospital, Baltimore, and the Mayo Foundation, Rochester. He holds membership in numerous medical societies.*

in one or the other forms of major tic douloureux. Then too an introspective psychiatric evaluation often gives ample reasons for the "painful syndrome of unknown origin." The treatment is obviously more successful when the cause is discovered.

The pain of neuritis, unlike the pain called "neuralgia," is continuous and is usually accompanied by tenderness, paresthesia, anesthesia, and possible motor paralysis if a mixed nerve is afflicted. Irritation or inflammation of the peripheral neurons is the cause of neuritis and a lesion of the central neurons is presumed to be responsible for neuralgia if no other etiologic factor is found. From the clinical standpoint the two nerves most frequently involved in neuralgia are the fifth and ninth cranial nerves; hence trigeminal neuralgia and glossopharyngeal neuralgia can be regarded as major forms of neuralgia (table I).

TABLE I

MAJOR AND MINOR TYPES OF NEURALGIAS AND OTHER PAINFUL CONDITIONS OF THE HEAD

I. Major types of neuralgias
  A. Trigeminal neuralgia
  B. Glossopharyngeal neuralgia
II. Minor types of neuralgias
  A. Occipital neuralgia
  B. Postherpetic ophthalmic neuralgia
  C. Superior laryngeal neuralgia
  D. Sphenopalatine neuralgia (syndrome of Sluder)
  E. Tympanic neuralgia (syndrome of Reichert)
  F. Vidian neuralgia (syndrome of Vail)
  G. Geniculate neuralgia (syndrome of Hunt)
III. Other painful conditions
  A. Migraine
  B. Histamine cephalalgia
  C. Costen's syndrome
  D. Psychogenic pain
  E. Temporal arteritis
  F. Miscellaneous conditions

MAJOR TYPES OF NEURALGIA

Trigeminal neuralgia. Trigeminal neuralgia usually affects patients beyond the fourth decade. It is rarely bilateral and usually involves one or more branches of the fifth cranial nerve on one side of the face. Excruciating paroxysmal and flashlike jabs of pain are characteristic of the syndrome. Krause[1] has stated that Avicenna described the symptoms as "tortua facies" about 1000 A.D. and that Fothergill described the disease as a "painful affection of the face" in 1773. Many others contributed subsequently to the treatment, but as in many other diseases, little has been added to the original description of symptoms. Injections of absolute alcohol into the involved branches of the fifth cranial nerve will give palliative relief, and permanent relief can be obtained from section of the sensory root of the gasserian ganglion. Section of the nerve root through the temporal approach, as developed by Frazier and Spiller,[2] has been the procedure of choice throughout the world for interrupting the pathways of pain through the sensory root of the fifth nerve. In recent years, however, Dandy's[3] procedure and that of Sjöqvist[4] have been used. In Dandy's procedure the nerve is cut close to the pons and in the Sjöqvist technic the descending root of the fifth nerve is cut in the medulla.

When the neurosurgeon selects a procedure in the individual case of tic douloureux he should be governed by knowledge that statistical studies over the years have proved the following to be true. In older patients and in those for whom the surgical risk is great the subtemporal section of the sensory root of the fifth nerve, as described by Frazier and Spiller,[2] is the safest. The operative mortality subsequent to this procedure by competent surgeons has been less than 1 per cent. Recurrence of pain in any of the roots after this operation has had the lowest incidence, but the complications of keratitis and paresthesias perhaps occur more frequently than when other procedures are used. When the sensory root is cut at the pons, as Dandy[3] suggested, the mortality rate is higher (3 to 5 per cent) and the incidence of recurrence of pain is higher because of incomplete section of the nerve. Paresthesias are slight after use of this latter surgical technic, and it offers the additional advantage of allowing exploration for aneurysms or tumors in the cerebellopontine angle. The technic involving intramedullary section of the descending root of the fifth nerve (Sjöqvist's operation) is reserved for young people in good general condition when it is imperative that the motor division of the nerve be spared. The largest incidence of recurrent pain occurs in this group, even though ocular complications are minimal (figure 1).

Glossopharyngeal neuralgia. Glossopharyngeal neuralgia occurs less frequently than does trigeminal neuralgia. The intermittent and paroxysmal pain is like that of trigeminal neuralgia but it occurs only in the region innervated by the ninth cranial nerve. The branches of this nerve supply sensory fibers to the ear, pharynx, tonsils and tongue. Neuralgia in regions of distribution of this nerve may involve any one of the branches or all of the branches as in trigeminal neuralgia. The trigger zone is mainly in the throat about the tonsillar fossa. Except for the location of the pain, cocainization of the tonsillar region on the affected side is the best method of differentiating between the two major forms of neuralgia. The diagnosis of glossopharyngeal neuralgia can be confirmed by the fact that swallowing cold water always precipitates paroxysms of pain and by the observation that cocainization of the pharynx and tonsillar region with 10 per cent solution of cocaine abolishes this pain reflex. Intracranial section of the ninth cranial nerve will provide permanent relief of glossopharyngeal neuralgia. It may be advisable to include also section of the upper rootlet of the tenth nerve at the same time that the ninth nerve is cut. The anesthesia induced by section of the ninth cranial nerve extends over half the pharynx, glottis, epiglottis, uvula and tonsillar area. However, the patient rarely complains of this (figure 2).

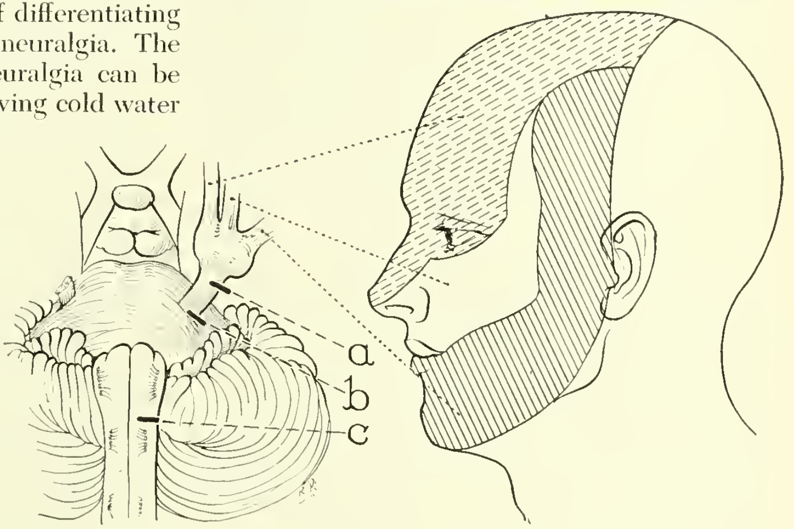

Fig. 1. Anatomic positions for interruption of the trigeminal nerve to control painful neuralgia. *a.* Frazier method (subtemporal, complete or incomplete section). *b.* Dandy method (infratentorial at pons). c. Sjöqvist method (intramedullary tractotomy).

MINOR TYPES OF NEURALGIA

Occipital neuralgia. Although occipital neuralgia is usually unilateral, it may be bilateral. When it is bilateral one side is likely to be more severely affected than the other. Pain invariably begins in the back of the neck below the mastoid process, extends over the side of the head and often centers behind the eye on the side affected. Pain back of the eye is due to close anatomic association between the descending root of the ophthalmic division of the fifth cranial nerve in the cervical portion of the cord and the origin of the greater and lesser occipital nerves. Block of the second cervical nerve by injecting it with procaine hydrochloride will help to establish the diagnosis of occipital neuralgia. To control the pain it may be necessary to use cervical traction, repeated injections of the nerve or rhizotomy of the sensory roots of the second and third cervical nerves.

Postherpetic ophthalmic neuralgia. Herpes zoster of the ophthalmic division of the trigeminal nerve affects mainly the supra-orbital and supratrochlear branches. The neuralgic pain is excruciating and disabling and satisfactory treatment is very difficult. Infection with a virus is thought causative and hence antibiotics such as aureomycin and streptomycin may give some

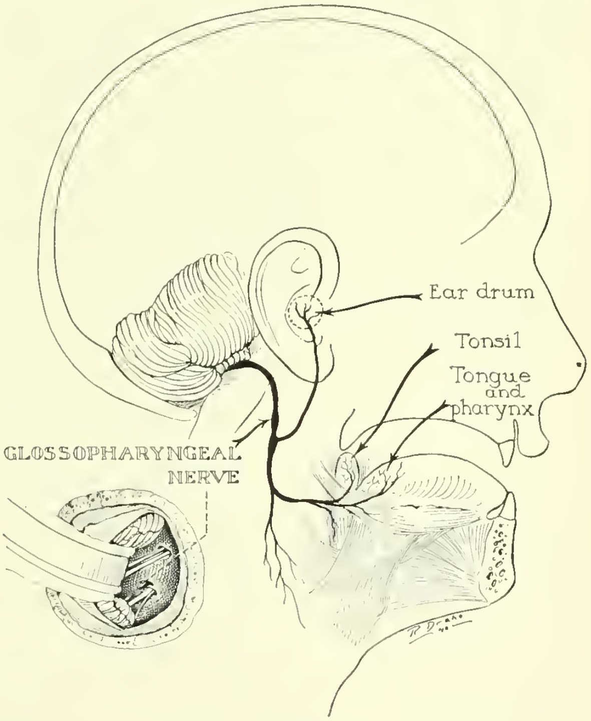

Fig. 2. Anatomic distribution of the branches of the glossopharyngeal nerve. Note diagram of suboccipital craniotomy and intracranial section of the ninth nerve showing relation of the latter to the seventh, eighth, tenth and eleventh cranial nerves.

hope of relief if they are used during the early stages of the disease. Roentgen therapy directed over the geniculate ganglion also is helpful early in the disease. Injections of alcohol and avulsion of the involved nerves may offer temporary relief. Relief has not been obtained in many instances from sectioning the posterior sensory root of the fifth cranial nerve, and prefrontal lobotomy has been necessary at times to interrupt the appreciation of pain from a mental standpoint if psychiatric problems are not otherwise controlled.

Superior laryngeal neuralgia. The pharyngeal plexus receives fibers from the glossopharyngeal nerve, the sympathetic nerves and the superior laryngeal nerve. It is unknown whether superior laryngeal neuralgia that is localized in the side of the neck opposite the thyroid cartilage is a distinct clinical entity or whether it is an atypical or incomplete form of glossopharyngeal neuralgia that is brought about because of anastomosis with the ninth cranial nerve in the pharyngeal plexus. Swallowing or touching the trigger zone with an instrument produces paroxysms of lancinating pain that extends from the side of the thyroid cartilage or from the trigger area in the pyriform sinus to the angle of the jaw and occasionally to the ear. If block of the internal branch of the superior laryngeal nerve by injection of procaine hydrochloride relieves the characteristic paroxysms of pain this indicates that relief may be expected by approaching the nerve through an incision in the neck and sectioning it distal to the ganglion nodosum. If more extensive measures are indicated intracranial section of the ninth cranial nerve together with interruption of the uppermost rootlet of the tenth nerve will give permanent relief.

Sphenopalatine neuralgia (syndrome of Sluder). Sluder[5] described various patterns of pain of the head and neck which he considered to be caused by sphenopalatine neuralgia. At present, however, these are thought to be due to a vasodilating type of headache and may be reflexly controlled by the sympathetic nerves. Sphenopalatine neuralgia is often described as headache of the lower half of the head. The pain has a wide distribution; it may be in the root of the nose, in the orbital area, in the upper jaw and teeth, in the temple, zygoma, ear, mastoid, occiput and the neck. It may extend to the shoulder and arm and even to the fingers. The same group of symptoms is presented by patients when the etiologic factor is in the cervical portion of the spinal column. In such instances the pain in the occiput and head is considered as a reflex phenomenon from stimulation of the sympathetic nerves and the descending roots of the trigeminal nerve in the spinal cord; it may even be pain which is distributed over the vascular tree to the vertebral artery or to the branches of the external carotid artery. The removal of the lesion in the cervical area has controlled the pain. The reverse may occur also with a focus in the sinuses, or allergic manifestations may be the trigger for such troubles. A histamine-like reaction or vasodilation is invariably the rule.

Injection of anesthetic agents into the sphenopalatine ganglion or cocainization of the posterior tip of the middle turbinate just above the ganglion with 20 per cent solution of cocaine has given relief in many cases. Sluder[6] also suggested that cure or help for the pain was obtained by the application of 2 per cent solution of silver nitrate, or 0.5 per cent solution of formaldehyde to the same part of the nose. Horton[7] recommended a program of desensitization for those patients in whom a typical attack can be provoked by histamine.

Tympanic neuralgia (syndrome of Reichert). Reichert,[8] in 1933, called attention to the fact that an incomplete form of glossopharyngeal neuralgia should be recognized. The neuralgic pain which is distributed through the tympanic branch of the glossopharyngeal nerve (Jacobson's nerve) represents an incomplete neuralgia of the glossopharyngeal nerve. Reichert proved that intracranial section of the ninth cranial nerve permanently cured the otalgia.

Vidian neuralgia (syndrome of Vail). Vail[9] defined vidian neuralgia as a pain of neuralgic character occurring in severe attacks in the nose, face, eye, ear, head, neck and shoulder. He stated that the attacks are most typically unilateral, are often nocturnal, may or may not be associated with the subjective symptoms of nasal sinusitis and cannot be caused by any external stimulation. The pain is not relieved by opiates and is not associated with any subjective loss of sensation.

The distribution of the painful symptoms in vidian neuralgia was explained by Vail as follows: The great superficial petrosal nerve comes from the geniculate ganglion of the facial nerve; the great deep petrosal nerve is formed by the branch from the carotid plexus and the small deep petrosal nerve from the petrous ganglion of the glossopharyngeal nerve. Thus, through the nerves uniting to form the vidian nerve, there is a close association among the sphenopalatine ganglion, the geniculate ganglion of the facial nerve, the superior cervical sympathetic ganglion, the glossopharyngeal nerve and the vagus nerve. The orbital, nasal and palatine branches pass from the sphenopalatine ganglion and it is easy to explain the referred pain in the eye, nose and teeth. The pain in the ear, a typical and characteristic part of the syndrome of vidian neuralgia, has a more complicated explanation.

Geniculate neuralgia (syndrome of Hunt). It is rare indeed to encounter a case in which severe pain in the ear and deep structures of the face is the result of disease of the geniculate ganglion, or sensory ganglion of the seventh cranial nerve. The patient who has undergone resection of the posterior sensory root of the gasserian ganglion for trigeminal neuralgia often will complain of a bizarre feeling in the deep structures of the face which may be attributed to the sensory preservation of the seventh nerve and chiefly to contraction of the facial muscles. This is regarded as an annoying pain but not as neuralgia. Several cases have been reported in the literature, however, which provide authoritative proof that the seventh nerve can be responsible for a severe ticlike intermittent pain. In every case reported permanent relief has been obtained by intracranial section of the nerve of Wrisberg.

Hunt investigated the herpetic, inflammatory lesions of the geniculate ganglion. He published his first report in 1907[10] and continued the study for many years thereafter. He has made outstanding contributions to our knowledge of the sensory system of the facial nerve and its neuralgic conditions. He asserted that geniculate neuralgia is a real clinical entity and that it belongs in the field of atypical facial neuralgias. It is possible that he is correct. In this connection it is also important to recall that a large group of neurologists and neurosurgeons, as well as otolaryngologists, have been studying their cases for forty years and only three authentic reports of relief of pain by intracranial section of the nerve of Wrisberg have appeared in the literature. One must assume, therefore, that this form of neuralgia is rare and that other forms of treatment, such as section of the glossopharyngeal nerve, may control the pain in many cases.

OTHER PAINFUL CONDITIONS OF THE HEAD

From the standpoint of differential diagnosis other painful conditions of the head must be separated from the true neuralgias. The commonest conditions are histamine cephalalgia, Costen's syndrome,[11] temporal arteritis, "jumping toothache," migraine, arteriosclerotic headache, pain of hemifacial atrophy and psychogenic pain.

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Painful Anal Lesions In Intestinal Disease

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Few human afflictions are associated with more genuine misery than the anal complications of intestinal disease. Although they are usually considered to be a minor complication of more serious disease of proximal portions of the intestine, they frequently so overshadow the underlying problem as to receive the physician's major therapeutic attention. The distress associated with anal fissures, anal abrasions, thrombosed hemorrhoids, severe cryptitis, rectal tenesmus, and anal spasm often tries the patience of not only the person afflicted but also the physician as well.

On the other hand, the anal disorder may run such a mild course, going on for weeks and months, that although it keeps the patient in more or less constant mental turmoil and torments him to the extent that he finds it difficult to cooperate in the management of his major problem, yet the discomfort apparently is never great enough to warrant a physician's major attention; hence, the anal disorder is treated as a subsidiary condition in the hope that it will improve with improvement of the patient's major disorder. In this way, the patient is allowed to carry on uncomfortably. His illness and his stay in the hospital are prolonged when both could have been shortened and the patient could have carried on relatively comfortably if part of the physician's attention had been directed toward control of the anal discomfort.

Among the dramatic and gratifying experiences in medicine is the quick relief that comes to some of these patients from a variety of symptomatic measures. One of the most pleasant and most easily administered of these is the application of preparations containing ethyl aminobenzoate (benzocaine). This may be applied conveniently in the form of anal suppositories.*

A word should be said about the method of using this suppository or any suppository. Suppositories are used to relieve some painful anal lesion such as an ulcer, abrasion or thrombosed hemorrhoid. In the presence of such a lesion there is usually a great deal of muscle spasm so that the suppository will be pushed on up into the rectum or will be extruded to the outside almost immediately after insertion. To avoid this and to keep the suppository in place, the patient is advised to lie down on the bed and after lubricating the end of the suppository to insert it into the anal canal for a half to three fourths of an inch, holding its end with a piece of gauze. In a few minutes the suppository will start melting at which time the patient is instructed to push it on up into the rectum. The ingredients of the suppository get to the point of discomfort and it will be much more effective if used in this manner.

An occasional person is allergic to preparations of ethyl aminobenzoate, and its use may be followed by a local dermatitis. While this is rare, one should be on the lookout for its occurrence.

Another pleasant and easy method of using this medication is as a dusting powder; the buttocks are spread and the medication is dusted from a salt shaker or some similar device. This method is particularly helpful and soothing when the anal irritation is just inside or about the anal canal.

Anal irrigations are of considerable value to patients with painful anal lesions for which surgical treatment is contraindicated. The patient is instructed to irrigate the rectum in the following manner. A 16 or 18 F. catheter is substituted for the hard-rubber enema tip. The enema bag is filled with plain hot water—water as hot

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*Manufactured by Medicone Company.

as the hand will tolerate for a minute. It is hung on the wall in the bathroom so that the catheter reaches down to the toilet level. Each time after the patient has a bowel movement, or at least twice a day if he has many stools, he gives himself a hot anal irrigation. He introduces the lubricated tip of the catheter into the anal canal as far as he can and yet ensure that the water immediately runs back out into the toilet. The irrigation should be given slowly and it should be hot; the procedure will take five or six minutes but will give relief from pain and frequently will be the means of healing an indolent painful ulcer.

Another helpful medicament is dibucaine which can be applied by inserting a perforated nozzle into the anal canal and lower part of the rectum. This is particularly soothing for thrombosed hemorrhoids, anal fissures and anal abrasions, and may do much for local comfort.

Witch hazel instilled into the rectum or applied locally with gauze packs is another medication which, while it temporarily may cause smarting, often offers great relief of anal soreness and tenesmus.

Medications of this type in no way affect the progress of the main disease directly, but the dramatic relief frequently achieved locally has such a salutory effect on the patient's general condition that improvement occurs much more rapidly. Much has recently been said and written about the psychosomatic aspects of intestinal disease. Any relief that can be given to a person who is suffering from local discomfort often has a profound psychosomatic effect on him generally. Thus a kind-spoken word, a gesture of encouragement, and application of a comforting and soothing medication all have a favorable effect on the general outcome of the patient's illness. The latter may frequently be disabling and difficult to bear; hence, any help that can be given, no matter how minor or symptomatic, becomes justifiable.

The attitude of some physicians toward the surgical treatment of fistulas of patients who have had ulcerative colitis may have been too conservative in the past. During exacerbations of the disease, surgical measures should be confined to only those that are necessary such as incision and drainage of abscesses. However, during the period of remission or when the disease is relatively quiescent, existing fistulas may be treated safely by surgical means. The repeated insults from recurrence of abscesses, with destruction of tissue (muscle) and fibrosis, will cause not only low-lying rectal strictures but sometimes anal incontinence as well, and much discomfort to the patient. In chronic ulcerative colitis, healing of anorectal conditions after operations done at the appropriate time will be complete and satisfactory; however, the time of such healing is usually prolonged.

The following illustrative cases are reported:

REPORT OF CASES

A woman aged 32 years came to the Mayo Clinic on December 27, 1951, with a history of chronic ulcerative colitis of six years' duration. At this time she had involvement of the entire large intestine with anovaginal fistula and rectal stricture limiting the lumen to about a centimeter. The stricture was dilated digitally with considerable discomfort. A suppository of ethyl aminobenzoate was inserted after each dilatation, with prompt relief of discomfort. Azopyrin was used as a major part of the treatment of colitis. When the patient returned for observation on April 1, 1952, the lesions in the colon had healed and the rectal lumen had returned practically to normal size.

A woman aged 45 years came on December 13, 1946, for treatment of severe chronic ulcerative colitis that involved the entire large intestine. She improved on symptomatic measures and was released. She returned on several occasions after that, the last time being on August 10, 1951. While the lesions in the colon had healed, there was a stricture of the splenic flexure, the nature of which could not be determined hence surgical intervention was advised, and since she apparently had been relieved of her colitis, ileosigmoidostomy was performed. Following this, there was exacerbation of the colitis and she developed a large anal fissure which gave her untold discomfort. Suppositories of ethyl aminobenzoate were inserted in the rectum with relief of the discomfort within a few days. With the patient observing the usual program, the colitis again subsided.

A man aged 23 years came in 1945 for treatment of severe chronic ulcerative colitis that involved the entire large intestine. He eventually recovered, but when he returned for observation in 1949, he had two large, separate carcinomas—one of the rectosigmoid and one of the ascending colon. He requested that he not have an ileostomy. Total colectomy with ileorectostomy was performed. He recovered but continued to have many stools. He gained weight and felt entirely well otherwise. At the time of his return in 1952, he had an anal fissure which was causing him much distress. He was instructed to insert a suppository of ethyl aminobenzoate into the rectum after each stool. He was given a low-residue diet and some azopyrin. In four days the distress from the fissure had disappeared.

A woman aged 55 years came for treatment on December 31, 1951, with a history of long-standing constipation. Her stools were usually hard and dry and she had had repeated anal abrasions and bleeding, anal discomfort, anal spasm and interference with bowel movement. Suppositories of ethyl aminobenzoate inserted into the rectum morning and evening resulted in marked relief of anal distress; complete relief followed control of her constipation.

A woman aged 39 years came on September 20, 1951, for treatment of severe chronic ulcerative colitis of two years' duration. There was involvement of the entire large intestine. Proctoscopic examination disclosed pronounced activity of the disease, the lumen of the bowel being contracted to about half its usual dimension. She had inflamed and enlarged anal papillae and an anal fissure. Suppositories of ethyl aminobenzoate gave decided relief.

A man aged 42 years, seen in April, 1951, had a carcinoma beginning 5 cm. above the anal margin. The lesion was fixed, ulcerating and associated with severe pain. His symptoms had begun three years prior to admission. He was given radium treatment and there was much anal discomfort. Suppositories of ethyl aminobenzoate used after each rectal examination and after each treatment gave marked relief of anal discomfort.

A man aged 45 years gave a history of left lower abdominal discomfort and an abdominal mass, resulting in a diagnosis of diverticulitis with perforation. Colostomy and later resection of the lesion were performed, diverting the fecal stream. Still later, clamps were applied to the spur preparatory to closure of the colonic stoma, and with the feces going down to the rectum, an anal fissure, swollen anal rectal mucosa and tender hemorrhoids developed. A suppository of ethyl aminobenzoate was inserted into the rectum every three hours, and after a few days his discomfort completely subsided.

A young woman had had long-standing constipation and an acute anal fissure developed after a period of rather acute diarrhea. This was associated with much tenderness of the anus. Suppositories of ethyl aminobenzoate inserted into the rectum every four hours for forty-eight hours resulted in complete relief of the discomfort.

COMMENT

The discomfort described in these conditions is often considered a rather minor inconvenience as far as the patient's primary disorder is concerned. However, it frequently is the patient's major complaint. Thrombosed hemorrhoids occur commonly in the wake of severe diarrhea from any cause. Under such circumstances, surgical measures are not only not indicated but should be avoided. Symptomatic measures of various kinds must be invoked. Suppositories of ethyl aminobenzoate have been particularly helpful in the control of this type of hemorrhoids and the various discomforts outlined.

Digests from Current Literature on Pain

THE NEUROSURGICAL ASPECTS OF HEADACHES AND PAIN IN THE HEAD. Gilbert Horrax, M.D. *Surg. Clin. North Am.* 32:763-770, 1952.

The following procedures for relieving intractable headaches or pains in different areas of the head and face are suggested:

Operative removal of *brain tumors.* Roentgen therapy should be tried first, however, for medulloblastomas, pituitary adenomas, and pinealomas.

Extirpation of *brain abscesses* and filling of the cavity with penicillin. Preoperatively, a period of three weeks should be allowed to ensure the encapsulation of the abscess. Repeated tappings and instillation of penicillin may cure some abscesses.

Washing out of the liquefied clot in *chronic subdural hematomas.* A trephine opening is made over each posterior parietal region of the skull and the dura opened by a small incision.

Sectioning of the trigeminal root or periodic alcohol injections for *trigeminal neuralgia,* or tic douloureux. Because surgery results in permanent facial anesthesia, injection of the infra-orbital and mandibular nerves is often preferred, relieving pain for a year or more.

Repeated cocainization inside the nose or procaine injection of the involved trigeminal branch for *atypical neuralgias;* subcutaneous injection of a 1 per cent procaine solution for *postherpetic neuralgia;* and excision for rare *neuromas of the trigeminal nerve.*

Surgical removal or sectioning of the trigeminal root for *tumors of the gasserian ganglion;* intracranial section of the ninth nerve for *glossopharyngeal neuralgia,* if pain is not relieved by trigeminal medications; and intracranial section of the nervus intermedium for *neuralgia of the Nerve of Wrisberg.*

A unilateral or bilateral neurectomy for *occipital neuralgia;* and antibiotic therapy or excision of the involved portion of the artery for *temporal arteritis.*

Alcohol injections before, during, or after radiation therapy to relieve pain of *cancer of the jaws, mouth, and tongue.* If pain is widespread, a combined suboccipital craniotomy and upper cervical laminectomy should be performed.

A pneumoencephalogram for *post-traumatic headaches* not yielding to mild medication and bed rest. The headache is often relieved and presence of a possible undiagnosed subdural hematoma disclosed.

Excision or "trapping" of *intracranial aneurysms.* Usually ligation of the internal carotid artery or of the vertebral artery is all that can be accomplished, but chances of a future rupture of the aneurysm are lessened.

Unilateral or bilateral lobotomy should be a last resort for intractable head pain. If performed, the responsible relative should have full knowledge of the possible mental changes. The procedure is valuable for patients with malignant disease, as dread of the disease is removed by the operation. J.F.E.

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THE CONTROL OF POSTOPERATIVE PAIN IN ANORECTAL SURGERY. Claude C. Tucker, M.D., *J. Kansas M. Soc.* 53:230-234, 1952.

Dramatic relief of postoperative pain and virtual elimination of narcotic requirements is achieved by the use of Efocaine in anorectal surgery.

The drug, an aqueous-miscible solution of the normally-insoluble procaine base and butylamino-benzoate, produces local anesthesia of approximately two weeks without local or systemic toxicity. Unlike other suspensions, dilution by body fluids causes a deposition of the anesthetic agents to form a crystalline depot that is slowly absorbed, producing a prolonged effect.

Claude C. Tucker, M.D., of St. Francis Hospital, Wichita, Kansas, reports a high degree of postoperative analgesia in almost all of 40 patients treated with Efocaine. Twenty-three patients needed no postoperative medication, 9 received one dose, 4 received two doses, and only 4 required more than two doses. Most narcotics were administered on the day of surgery and for reasons other than pain in the operative area. Control patients undergoing identical surgery required medication for at least four days postoperatively.

Local anesthesia was generally present for more than 10 days, though in one instance effects wore off after five days and in another after seven days. Such patients, reinjected with Efocaine, again experienced prolonged anesthesia.

Patients generally felt better, early ambulation was promoted, and no local tissue reactions nor untoward effects were observed. Only 6 patients (15 per cent) had to be catheterized, all on the day of surgery, whereas 66 per cent of most anorectal patients are catheterized at least once, 20 per cent twice, and 9 per cent three or more times. J.F.E.

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GYNECOLOGIC CAUSES OF PELVIC PAIN.

Joseph W. Douglas, M.D., *J. Florida M. A.* 38:619-622, 1952.

After ruling out urologic disease, orthopedic conditions, and diseases of the sigmoid and rectum, patients complaining of pelvic pain should be carefully evaluated for gynecologic etiology.

Therapy must be individualized, however, for a set of rules cannot apply to the six gynecologic diseases usually causing pelvic pain. In questionably symptomatic conditions, a policy of "watchful waiting" with reassurance to patient is indicated rather than exploratory laparotomy.

Cervicitis is treated by cauterization, conization, or plastic repair. Preoperative dilatation and postoperative check-ups are essential to avert cervical stenosis. Surgery is not indicated in *pelvic endometriosis,* as many of the symptoms can be ameliorated with testosterone. When involvement necessitates surgery, conservative procedures are followed in younger patients, but uterus and adnexa are removed in older women.

Suspension of the *retroverted and prolapsed uterus* should be reserved for patients with uterine symptoms severe enough to justify laparotomy. The pessary test is helpful in deciding whether this greatly "overworked" operation should be performed.

The management of *uterine enlargements* depends upon the severity of symptoms, nature of the disease, and age of the patient. The enlarged uterus is best removed in a woman near or beyond menopause. Many others are also better off with hysterectomy than a conservative procedure necessitating further surgery later.

A conservative attitude is advised in *adnexal disease.* Antibiotics and chemotherapy often reduce an acutely-tender tubo-ovarian mass, and many large "simple" ovarian cysts disappear if left alone. Laparotomy is indicated if the ovarian cyst persists or increases in size.

Cases of *"congestion-fibrosis"* syndrome are best managed by relief of emotional strain. In fact, many exploratory laparotomies would be eliminated if the psychosomatic element were considered. J.F.E.

Books on Pain

ANESTHESIA IN DENTAL SURGERY.

Sterling V. Mead, 1951. Second edition. St. Louis, Missouri: The C. V. Mosby Company. 648 pages, 212 illustrations.

This valuable textbook on anesthesia has been prepared for a very definite purpose. As the author explains in the preface to this edition: "Anesthesia for dental practice presents problems that differ from anesthesia for medical purposes and for general surgery.

"With inhalation anesthesia, the dentist is obliged to operate in one of the channels through which anesthesia is given. The dentist working in the mouth, of necessity, creates certain mechanical interferences which make proper anesthesia more difficult. The technic of inhalation anesthesia for dentistry, therefore, must be altered to meet these conditions.

"Patients presenting for dental operations are usually ambulant and are unwilling to cooperate with many of the procedures, financially and otherwise, that are accepted for what they consider more major operations in the hospital.

"The greatest single factor in the advancement of dentistry was the early recognition by the dental profession of the necessity of the alleviation of pain during operations. Anesthesia has been of as great benefit to the operator as to the patient, for with it, he is able to operate efficiently, calmly, with peace of mind, steady hand, and time to concentrate upon the work before him without being unduly disturbed. It has taken away much of the strain and nervous fear on the part of the patient.

The book covers the selection of anesthesia, evaluation of risk and gives consideration to analgesia. Reference is made to teaching and research in the field and much space is devoted to the history, anatomy and technic of block anesthesia. The complications of local anesthesia are considered and much attention is given to general anesthesia, its history and physiology, preoperative preparation for it, and to equipment for inhalation anesthesia. There is a chapter on intravenous anesthesia; the barbiturates are particularly stressed and the most space is given to the intravenous use of solution of Pentothal Sodium. Rectal anesthesia is dealt with briefly; tribromethanol is mentioned. Inhalation anesthesia is treated at length; the carbon dioxide absorption technic is included. The use of nitrous oxide and oxygen is explained. Ethylene is mentioned briefly, as is cyclopropane. Ether is considered more at length. Adequate consideration is given to Vinethene, chloroform, Ethyl Chloride and trichlorethylene. Reference is made to curare. The question of complications is taken up, including shock, and space is devoted to artificial respiration and the stimulants used in emergencies. Tracheotomy is dealt with and a chapter is devoted to postoperative care.

The book is well indexed, has been especially well done, and yet has been kept to a usable size. J.S.L.

Section on PAIN

Section Editor: JOHN S. LUNDY, M.D.

This special section will appear in the JOURNAL-LANCET *from time to time as determined by the interest of our readers and the amount of noteworthy material available for publication. The next section will appear in the February 1953 issue. All inquiries and manuscripts for this department should be sent to Dr. John S. Lundy, 102 Second Avenue S.W., Rochester, Minnesota, or to the Editorial Department,* THE JOURNAL-LANCET, *84 South Tenth Street, Minneapolis 3, Minnesota.*

EDITORIAL

> O Death the Healer, scorn not thou, I pray,
> To come to me: of cureless ills thou art
> The one physician. Pain lays not its touch
> Upon a corpse.
>
> —AESCHYLUS: Fragment 250

TO THE ANCIENTS, to the people of the Middle Ages and Renaissance, and in fact to all who lived before the middle of the past century, the words of Aeschylus were as valid as when they were written, half a millenium before the Christian era. Death was, in thousands of cases, the only certain relief from pain.

Somewhat more than a hundred years have passed since the conquest of pain from the standpoint of anesthesiology. During that relatively fleeting period in human existence more advances in the alleviation of pain have been made than in the ages between Aeschylus and the discovery of ether anesthesia.

Pain is something which confronts every physician, however limited his practice may be or whatever his particular interest in medicine. Often it is the only manifestation which brings the patient to the physician for the first time. No one goes through life without it, but, happily unlike the days of Aeschylus, much can be done about it today.

Lost sight of, in the course of the rapid and sometimes astonishing advances in measures for the relief of pain, is the fact that every physician, out of his clinical experience alone, is well qualified to contribute something to the sum of knowledge about pain. Each day of his life he is called upon to do something, as best he can, about the problem of pain.

In view of the vast and unwieldly specialization of the medical literature today, any contribution, however small, to a field which must engage the attention of all physicians would seem to be eminently worth while. In the pages of this issue will be found several such contributions. Each, in its own measure, is an addition to the implements carried forward in the unceasing campaign to render Aeschylus' bleak judgment nothing more than an impressive poetic fallacy.

J. S. L.

Questions and Answers

IN the survey made of the February, 1952, issue on pain, Dr. Harold F. Bishop of Grasslands Hospital, Valhalla, New York, suggested a type of question as follows:

What is advised for the relief of pain in the immediate postoperative period (seven to ten days after operation) following open operations on the thorax when one or more ribs are resected or broken for the purpose of adequate exposure? Do you suggest:

1. Use of narcotics?

2. Nerve injection by the surgeon or anesthetist? What drug is used for injection—procaine, alcohol, Efocaine, Dolamin, Intracaine in oil? Is it to be injected preoperatively, during operation, postoperatively?

3. Intravenous use of alcohol?

4. Crushing of the involved nerves?

5. Cutting of a segment from the involved region?

Dr. John W. Pender, Section of Anesthesiology, Mayo Clinic, Rochester, Minnesota, was asked to supply answers. He interviewed Dr. O. T. Clagett and Dr. J. W. Kirklin with whom he works a great deal in operations in and on the thorax, and although they had experienced little difficulty with pain during the period of a week to ten days after operation, nevertheless, they suggested the following answers:

1. Use of narcotics: At one of the local hospitals the practice is to use meperidine or morphine in moderate doses for the first two or three days and then to give codeine by mouth or by hypodermic injection if necessary, during the next four or five days.

2. Nerve injection: The thoracic nerves are not injected preoperatively or during operation. For the occasional patient who complains of pain in the thoracic wall several months after operation, paravertebral somatic nerve blocks are performed by the anesthesiologist with procaine-like agents, such as Dolamin or rarely benzyl or ethyl alcohol.

3. Intravenous therapy: The intravenous use of alcohol or procaine has not been beneficial in relieving post-thoracotomy pain.

4. Nerve resection: Dr. Clagett cuts the thoracic nerve associated with the rib which is resected if the patient is more than 35 years of age.

Other questions on problems of pain are solicited for future treatment, if the idea meets with popular response. All queries should be addressed to the editor of this section, Dr. John S. Lundy, 102 Second Avenue S.W., Rochester, Minnesota, or to the Editorial Office, THE JOURNAL-LANCET, 84 South Tenth Street, Minneapolis 3, Minnesota.

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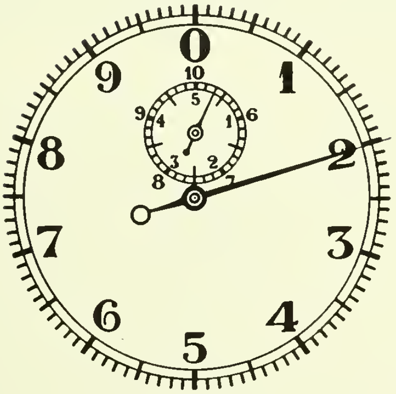
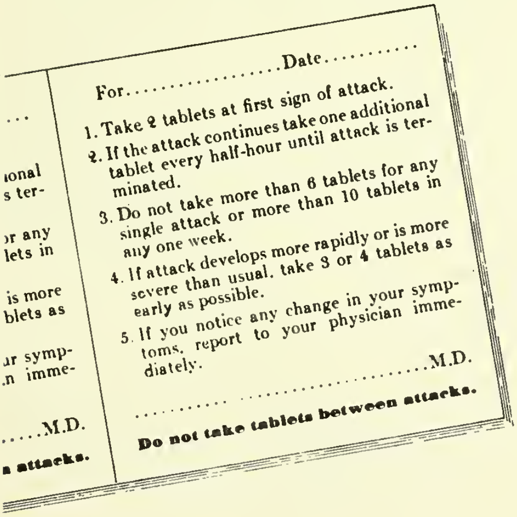


minutes are of the essence in migraine therapy . . .

Pharmacotherapy, psychotherapy, physiotherapy and surgery, may be employed individually or in combination for therapy of head pain. De Jong's concept of pharmacotherapy in migraine may well be employed to treat most cephalalgias; first—treat or shorten the individual attack and second—prevent the recurrence or lengthen the intervals between attacks.

The first principle in treating the headache is to start immediately when the first sign of trouble appears. The earlier treatment is started, the more successful it is likely to be.

De Jong, R. N.: Chicago M. Soc. Bull. *54:*106 (Aug.) 1951.



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1. Take 2 tablets at first sign of attack.
2. If the attack continues take one additional tablet every half-hour until attack is terminated.
3. Do not take more than 6 tablets for any single attack or more than 10 tablets in any one week.
4. If attack develops more rapidly or is more severe than usual, take 3 or 4 tablets as early as possible.
5. If you notice any change in your symptoms, report to your physician immediately.

.............................M.D.

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This is the twelfth and last in a series of letters from Dr. Ancel Keys, director of the laboratory of physiological hygiene at the University of Minnesota, during a year of study and travel abroad.

Notes from a Medical Journey

28 August, 1952
Birmingham, England

Dear Jay:

Tomorrow we sail for New York and even now, I trust, our luggage, grown alarmingly by the accretions of a year, is on the Cunard dock at Liverpool. Here in Birmingham we have stayed two days with the A. C. Frazers, the children making merry with the four young Frazers and I giving the inevitable lecture. Dr. Frazer, who lightly bears the title, "professor of pharmacology," has built up a staff of some sixty people vigorously studying all manner of problems of fat absorption and metabolism.

As usual, the time is too short to take a real look at the manifold research activities of this great medical center and I wish I could spend some time with Zuckerman, the Professor of Anatomy; Lancelot Hozben, the mathematician and biologist, and Elkers, the newly installed professor of experimental psychiatry. Birmingham is rather like the University of Minnesota Medical School at present -- young, full of action and ideas, already accomplishing greatly and promising greater things to come.

I had hoped to write from Denmark but there things were upset by an acute lumbago which put me in the Skodsborg Sanatorium for three days. Massage, heat, wet packs and more massage put things right and allowed me to see the inner workings of one of the world's first centers of physical therapy. Dr. Fritz Buchthal, the neurophysiologist, lives in Skogsborg (near Copenhagen) and is influential with the Sanatorium directors so I was at once installed (in spite of hundreds on the waiting list) in a fine old room with a balcony looking over the oresund to Sweden. On that same balcony, over 100 years ago, sat the Kings of Denmark and of Sweden, drinking their healths and toasting their promise of perpetual peace between their countries. The royal villa, as it then was, later became a part of the Sanatorium where, sad to relate, the still-persisting non-alcoholic regimen was introduced.

Denmark, last visited before the war, has changed little and the Danes are still both gay and hard-headed, outspoken and hard-working.

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The children swam at the Skaw, in the Kattegat, and in the oresund, and we all ate vast amounts of the rich fare offered by the Scandinavian table in the homes of friends and in restaurants. From old friends like P. Brandt-Rehberg (August Krogh's successor as professor of zoophysiology), I learned that the University of Copenhagen (and the other Scandinavian Universities) is cramped for space, beset with new financial problems, and concerned about the increasing demands made upon them. But they continue to maintain their old standards -- probably the highest in the world -- and they still manage to avoid the short-time research project grant which is such a curse to serious research in the United States.

From Denmark we drove on through Germany to the Austrian Tyrol and a couple of days on the Italian slope of the Alps. Seven years after the end of the war the unending succession of ruins in Germany must be seen to be believed. Lubeck, Hamburg, Hannover, Munich and on the northward return several weeks later, Freiburg, Worms, Mainz, Coblenz, Cologne were scarcely more than names on some new and deceitful map, unrelated to memories of my wanderings on a bicycle twenty years ago. An occasional scarred edifice seemed oddly familiar but grotesquely out of place in a jumble of surroundings desolation and new make-shifts. But there is bustling activity everywhere, the Germans are obviously working hard (more so than any other Europeans one saw except the Italians), and I suppose that twenty years from now the rawness will be covered and there will be new cohesion and structure instead of the present formlessness of communities. Much is lost beyond repair -- I am thinking of more than buildings -- and we can only hope that more of bad than of good has been destroyed.

A week of loafing in the Tyrol was a great delight. For me, at least, there is no better mental and moral, if not physical, hygiene, than the majesty of mountains and a stiff climb, the sweat running free and almost out of breath for hours at a time. Then a pause on some high outlook, with a loaf of bread and a chunk of cheese for refreshment.

And so, finally, back to England and a scramble of visits and packing and the incomprehensible fact that the last hours of a year are slipping by. I wish I could add it all up, summarize and give conclusions for myself as well as for your and our mutual friends. I can give a chronology of days and places, of distance and of recorded events. Let's see, eighteen lectures in twelve cities, subjects studied in Oxford, in Naples, in Madrid, and so on. But beyond such elementary points I can't yet sort out the significant facts in a welter of impressions and remembered incidents. The more important things are the hardest to put down in words and I'd have to write more letters to make sense out of what seems to me the significance in scientific work and medical problems in this part of the world. Now I can do no more than insist that all this side of the Atlantic -- meaning the British Isles and northern and western Europe, including Italy -- is part and parcel of our own culture and tradition and future. We not only have the same problems; we react to them in the same way and must solve them in parallel if not in concert. It seems to me to be nonsense to ask questions like, "Shall we cooperate with Europe?" It is as though we asked, "Will the Far

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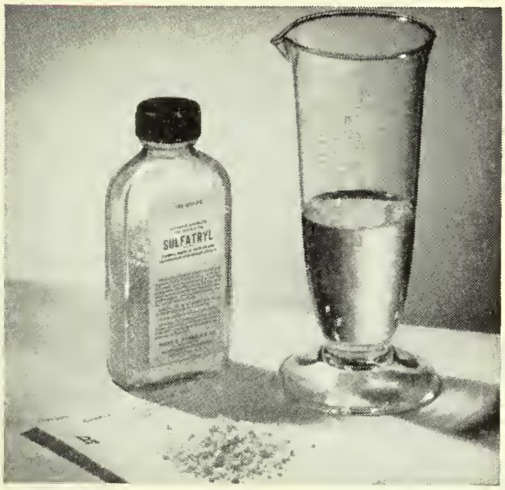

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West cooperate with the Middle West?" We must -- and will, I trust -- build on the fact that we are (even though we may not like it!) irrevocably tied to the Swedes and Scots, the Frenchmen and the Italians, the Portugese and the Dutchmen by our common culture and our unique view of the place of man in the universe. I could get more specific and I could put this in terms of simple things like caring for the sick, but perhaps I am only stressing what is obvious to us all.

Anyway, it is time to get home and to take my more accustomed place among our friends. The near prospect is wonderful and I hurry to greet you all personally, material hand-on-hand, instead of with these remoter letters. Until a short while, then, I am

As ever,

Ancel Keys

BOOK REVIEWS

★

A Textbook of Orthopedics, with a section on Neurology in Orthopedics, by M. Beckett Howorth, M.D. Philadelphia: W. B. Saunders Co. 1,110 pages. $16.00.

This attractive book of 1,110 pages evidently represents a lifetime of work. As the author says, it is based on twenty years of experience. Every type of orthopedic problem is well discussed. In addition, there is a fine section on neurology in relation to orthopedic practice, written by Fritz Cramer. This addition is doubtless a good one because neurologic injuries commonly result in orthopedic problems, and often a neurologist and an orthopedist must work together.

All medical readers, and certainly all orthopedists will be grateful to Dr. Howorth for the remarkable first chapter on the history of orthopedics. There one finds pictures of the men who in the past contributed so much to the knowledge of this subject. There is also a very fine bibliography on the history of orthopedics. W.C.A.

•

The Treatment of Injuries to the Nervous System, by Donald Munro, M.D., 1952. Philadelphia: W. B. Saunders Company. 284 pages.

In these days when so many hundreds of badly injured soldiers are being flown quickly from the front to a base hospital, neurosurgeons are having to develop new skills in the handling of persons with severe brain and cord and nerve injuries. The book has been written, however, for the use of the general surgeon and the use of the general practitioner because they often have to deal with these cases. They may have to inherit and take care of some paraplegics. Oftentimes the general surgeon or the general practitioner is the first to see the boy who gets a broken back. Up till now these non-specialists have been greatly handicapped in their work by the lack of any concise book dealing with these problems.

Current methods in use in the author's neurosurgical clinic in the Boston City Hospital are described. There is a fine chapter on the cost of the medical care of paraplegics, and how it may be modified by rehabilitation services.

Every medical man who has to deal with the badly injured man will be tremendously helped by the information supplied by this book. It will help him in carrying the patient from the first shock of injury up to the rehabilitation, and the getting around on artificial limbs. W.C.A.

•

Advances in Medicine and Surgery, from the Graduate School of medicine of the University of Pennsylvania and London: W. B. Saunders Company. 441 pages.

The volume "Advances in Medicine and Surgery" is a collection of papers presented in a series of symposia by the Graduate School of Medicine of the University of Pennsylvania. The symposia are on the following subjects: The Present Status of Adrenal Cortical Hormones, The Role of Potassium in Health and Disease, Hypertension: Newer Aspects of Medical and Surgical Treatment, Newer Concepts in Preoperative Evaluation and Preparation of Patients, Thromboembolism, Pulmonary Infections, The Relief of Pain, Current Status of the Cancer Problem, Recent Developments in Viral Diseases and Functional Disorders. The material is presented in 53 papers by 55 contributors.

The material in these symposia is well organized and the current advances in our medical knowledge are presented. The subjects are documented from the fundamental and clinical approach.

This book presents a good basic education in the subjects of the ten symposia selected by the Faculty of the Graduate School of Medicine. E.R.A.

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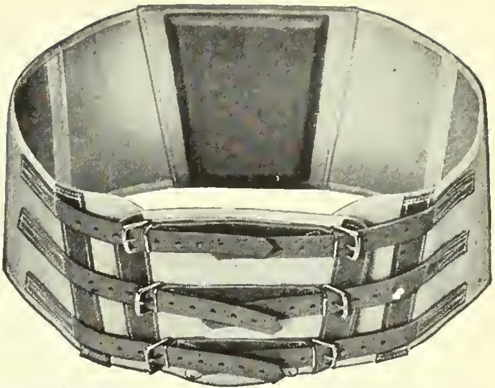

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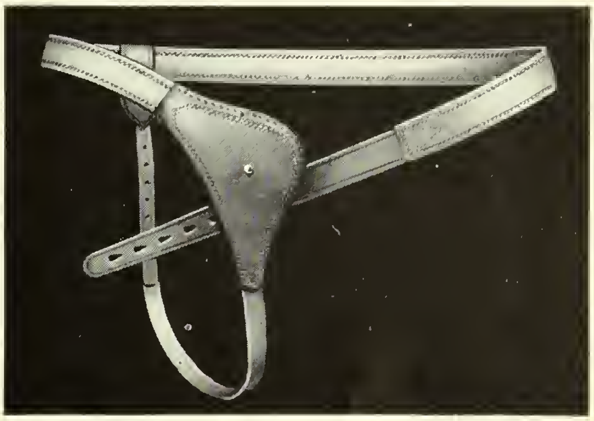

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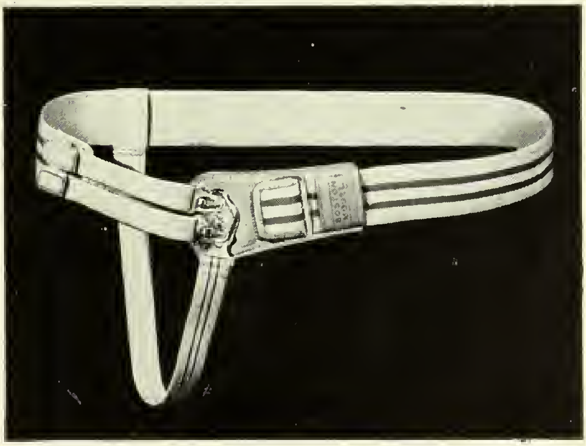

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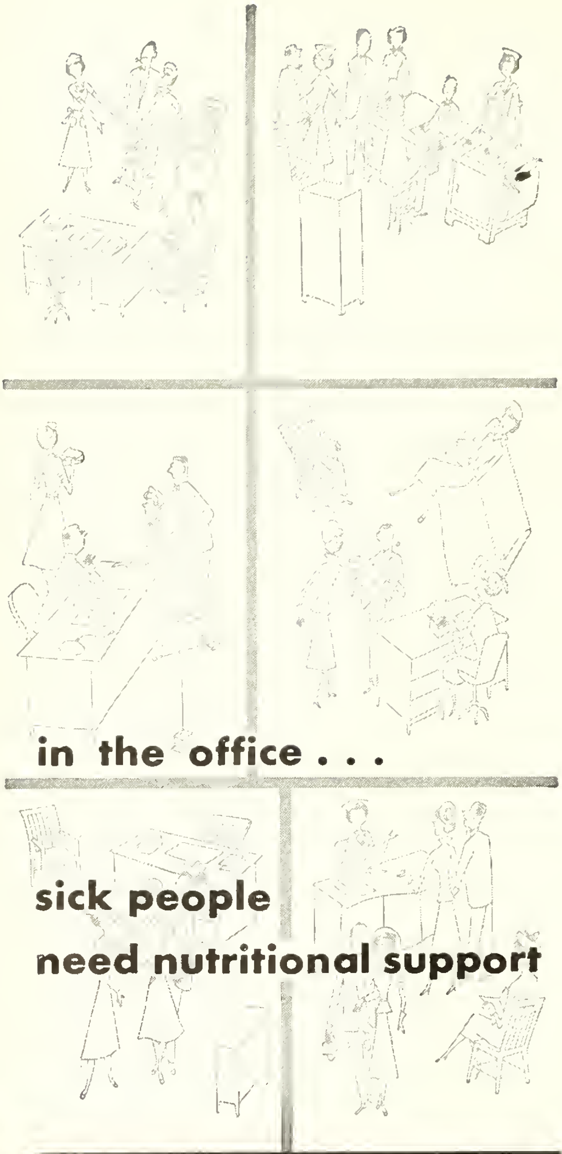

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American College Health Association News

Annual reports of the Student Health Service for the year 1951-1952 have just been received from two institutions, the University of Southern California and the University of California at Los Angeles.

The University of Southern California Health Service moved into a new half-million dollar student health center in September, 1951. A staff of thirty physicians together with qualified specialists for consultation services serve the 9,000 students in the 22 bed infirmary and the most modern equipped out patient clinic. Paul O. Greeley, M.D., Ph.D. director, reports an average of 198.5 patient visits and 279.7 procedures per day handled in the outpatient clinic. Services are available 24 hours a day, seven days a week. The infirmary normally ran to 50 per cent its maximum load.

The health service has been licensed as a specialized hospital and for the training of clinical laboratory techicians. The physical therapy department is operated by a graduate approved therapist who is also on the teaching staff of the School of Physical Therapy.

The first dental survey which was conducted by the University School of Dentistry during the entrance health examination proved of sufficient value to make it a permanent procedure.

Grants have been received from Cutter Laboratory for the study of diptheria toxoid, from the Los Angeles County Tuberculosis and Health Association for a special all University chest x-ray survey, and from G. D. Searle & Company for a study of drugs useful in hyperhydrosis and dysmenorrhea.

While the University of Southern California is enjoying its new health service facilities, the staff of the neighbor institution at the University of California at Los Angeles is looking forward to permanent quarters in 1954. The new medical center will house both the Medical School and the Student Health Service. For the first time a student hospital unit consisting of 55 beds will be available.

The University of California at Los Angeles report, submitted by Donald S. MacKinnon, M.D., director, gives a detailed account of the activities of the Student Health Service, together with a statistical summary of all services rendered. Your reporter was particularly interested in the statement referring to the continuing expansion of group psychotherapy which was begun as an experiment two years ago. This method has proven to be the only economically feasible way of reaching large numbers of students with mild emotional problems.

* * *

This news column is a place for you to share with your colleagues your experiences and approaches to the practical problems of student health service practice. The ways you go about solving your problems may be of interest and help to others who have similar problems. You, as well as your colleagues, will benefit by an exchange of ideas and methods. Send your ideas to the secretary now.

Proceedings of the fifteenth and the twenty-eighth annual meetings of the Pacific Coast Section and the Ohio Section, respectively, have been received by the secretary. Both reports contain a great deal of worthwhile information.

* * *

Dr. John J. Lorentz, formerly with Merrimack College, has been recalled to active duty in the U. S. Army. During his stay in the service, he will be replaced at the College by Dr. Edward A. Derby. Dr. Lorentz is at present studying at the Mayo Clinic.

* * *

Dr. W. Goodricke Donald of the University of California, Berkeley, reports the following activities of the Health Service:

* * *

University of New Mexico College Health Service has a vacancy for a qualified physician. Anyone interested should contact: Dr. J. E. J. Harris, Director, Health Service, University of New Mexico, Albuquerque.

* * *

Occupational health program. On January 25, 1952, the Board of Regents authorized the employment of an industrial health safety engineer, together with technical and clerical assistance, to make a complete survey of occupational health hazards on all campuses of the University of California. On April 1, 1952, Mr. Fred Ingram took up his duties as chief engineer and administrative head of the new Department of Occupational Health. To date the emphasis has been placed on gathering of survey data, consultation with individual departments on the various campuses, studies of workroom conditions, and making recommendations for alleviating hazardous conditions.

* * *

Radiation safety program. As part of the University's program of protecting personnel who work with radioactive materials, a system of physical examinations for all employees and students exposed to ionizing radiation was instituted on the Berkeley, Los Angeles, and Davis campuses. It consists of (1) preplacement medical examination, including physical examination, 14 x 17 chest x-ray, complete blood count and urinalysis (2) complete blood count and urinalysis every nine months (3) physical examination, chest x-ray, complete blood count and urinalysis every eighteen months (4) complete examination at time of termination of work. To date 382 of these examinations have been completed.

* * *

Chest x-rays on students working in homes. Following the discovery of tuberculosis in a student employed in a home where there were children, a program of chest x-ray examinations was set up last year to protect the households of people employing University students. Applicants for work as baby sitters or part time or full time help in homes are referred by the Bureau of Occupations to the Student Health Service. A chest x-ray is taken and the student is certified by the roentgenologist as being free from tuberculosis. A case of recently activated tuberculosis was discovered last month through this procedure, proving the worth of the program.

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Notices . . .

UNIVERSITY OF MINNESOTA CONTINUATION COURSES

A course in Fractures and the Surgery of Trauma will be held on November 13, 14 and 15, and will include a discussion of the evaluation of injuries from the medicolegal aspect.

* * *

On November 21 and 22, the University will present a Conference on Pemphigus and the Bullous Dermatoses for dermatologists. The one-and-a-half day session will be devoted to the consideration of the pathology, physiology, clinical characteristics, and treatment of the bullous dermatoses.

* * *

A Symposium on Rheumatic Fever, sponsored by the Minnesota Heart Association, will be held at the University of Minnesota November 29 to December 1, 1951. There is no tuition fee for the symposium and registration is not necessary. For further information write to Dr. Lewis Thomas, care Minnesota Heart Association, 542 Endicott-on-4th, St. Paul 1, Minnesota.

* * *

A course in Endocrinology will be presented on December 4 to 6, and will include discussions of recent advances in the clinical use of ACTH and cortisone, the treatment of diabetes mellitus, and other common endocrine disorders. Dr. Dwight J. Ingle, pharmacology research, the Upjohn Company, Kalamazoo, Michigan, will be the guest faculty member for the course. Dr. Ingle will present the Journal-Lancet lecture on December 4.

Essay Award

The American Goiter Association again offers the Van Meter Prize Award of three hundred dollars and two honorable mentions for the best essays concerning original work on problems related to the thyroid gland. Essays may cover either clinical or research investigations; should not exceed 3000 words in length; must be presented in English; and a typewritten double spaced copy in duplicate sent to the corresponding secretary, Dr. George C. Shirers, 100 East Saint Vrain Street, Colorado Springs, Colorado, not later than February 15, 1953.

CURRENT TRENDS IN VITAL STATISTICS REGISTRATION—(Continued from page 521)

of immature infants and suggestions for securing more accurate measurement and reporting of the weight; and the importance of filing records for all live births and death records for those who do not survive.

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(Continued from page 517)

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Surgical Problems in Rheumatic Valvular Heart Disease*

RICHARD L. VARCO, M.D. and
IVAN D. BARONOFSKY, M.D.
Minneapolis, Minnesota

With any grave lesion, the need of supplementing nonoperative management by surgical techniques will inevitably produce doubts and mental reservations as well as gratifying moments. To adopt the wisest course for each case assuredly requires both an open mind and an attitude of most careful inquiry on the part of all physicians concerned. This transition time in our thinking exists now in regard to surgical therapy for rheumatic valvular heart disease. Just as the inherent challenge in medicine is to restore health, an equal obligation exists to do no wrong to the patient. When faced with these alternatives, one man may unhesitatingly choose to operate; another will be willing to proceed only after the most careful and detailed study possible for each patient, both before and in the weeks succeeding an operation. For our part, to look upon mitral stenosis as inevitably a surgical condition represents as pathetic a disservice to medicine as it would be to reserve surgical management only for the sufferer from a duodenal ulcer.

True, we need no longer question the feasibility of surgical treatment for certain cases of mitral stenosis. The technique of mitral valvuloplasty has been tested, and for the proper case will largely correct, for the time being, the stenotic lesion, with demonstrable attendant benefits to the patient in increased physical activity. The question alarming many deeply interested in this disease is: Has technique surpassed knowledge? Merely being able to perform an operation should not justify the performing of it. Assuredly there are cardiac states for which an operation is regularly required — for example, patent ductus arteriosus. Proof is yet lacking, however, that one should operate upon all cases diagnosed as mitral stenosis. The accumulation of a large operative series is but one way to settle this question. At least as acceptable an alternative is an attempt at careful clinical evaluations and precision measurements which seek to chart the physical changes taking place as a consequence of the disease and the alteration of these values after surgical treatment.

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Although many an observer at necropsy had viewed the stenotic mitral area and considered in silence the feasibility of enlarging that narrowed tunnel, Lauder Brunton[1] in 1902 was probably the first to give this therapeutic vision those qualities of endurance possessed by the written word.* "Mitral stenosis is not only one of the most distressing forms of cardiac disease but in its severest forms it resists all forms of treatment by medicine. . . . The good results that have been obtained by surgical treatment in wounds of the heart embolden one to hope that before very long similar good results may be obtained in cases of mitral stenosis." The minds of his contemporary colleagues were unprepared to accept this concept;[2-4] twenty years would elapse before Allen and Graham[6] would examine experimental approaches to this problem. In addition to developing a cardiovalvuloscope with a cutting attachment, they properly called attention to the value of a transauricular rather than a ventricular approach to the mitral area.

During approximately the same period, Cutler, Beck, and Levine[7] labored long in the laboratory developing and perfecting techniques for the creation and correction of valvular stenosis. Their ultimate instrument, a punch-type valvulotome, was deliberately constructed and positioned to create a mitral insufficiency when used. In both man and animals this operative defect often resulted in an intolerable regurgitant flow. The group overlooked the essentially spinnaker-like action of the aortic cusp of the mitral valve, which seals this area and turns the ventricular outflow gush septalward and into the aorta. One patient, a child, operated upon by Cutler in 1922,[8] survived four years and appeared clinically improved. This single and partial success plus a similar result by Souttar in 1925[9] did not suffice to overcome the dissuasive medical attitude engendered by several other simultaneously recorded failures.[10,11]

More than twenty years again passed before another generation was sufficiently intrigued by the problem of mitral stenosis to essay once again its operative correction. Abruptly, in widely scattered sites, and through the use of somewhat divergent techniques, a greater percentage of operative successes was realized than ever before. Very little more information about this subject or its management was now available than had been available decades earlier. The good results probably stemmed, as much as from anything else, from a more painstaking attention, by these several groups, to numerous small details of preoperative, operative, and postsurgical management. This tidy accumulation of many precise technical steps, each carried through a little bit better than ever before, was the substance from which successes were built.

From 1948 on, Harken,[12] Bailey,[13], Smithy,[14a,b] and Baker,[15] together with their colleagues, were operating on patients suffering from mitral stenosis. Nearly all groups achieved an ever declining mortality as experience revealed, and often suggested, the remedy for certain of the more hazardous features associated with this surgical procedure. This use of some type of valvuloplasty has now spread to numerous surgical institutions throughout the world. Currently, owing to the broad dissemination of this knowledge, the risk in a thoracotomy and cardiotomy performed on a person with lesser degrees of mitral involvement is rather low if the surgeon is experienced with the procedure. Progress has been slower, however, in the development of preoperative evaluation techniques which will correlate well both with the operative findings and with the clinical results of the surgical procedure. Reports of preoperative and postoperative tests designed to measure work capacity, altered cardiac function, and related matters are few, although at least several hundred patients already have been treated surgically. The papers of Gorlin and coworkers,[16a,b] Ellis and Harken,[17] and Harken and his associates[18] are refreshing exceptions to this prevailing lack of analyzable physical data.

An indirect, palliative approach to the problem of helping the patient with mitral stenosis was reported by Bland and Sweet in 1948.[19] To avert the real hazard of acute pulmonary edema, provoked by high pulmonary venous pressures which developed through the husky contractions of a healthy right ventricle, a shunt was completed between the pulmonary venous circuit and the azygos vein. D'Allaines and colleagues[20] have employed a similar extracardiac by-passing procedure. While removing the specter of sudden death from a "drowned" lung, to be sure, it did little to raise the left ventricular cardiac output from what often was a mere subsistence value.

O'Farrell's analogous solution,[21] to create an interatrial septal defect, was based in part on clinical observations that with a Lutembacher's syndrome, pulmonary edema or hemoptysis was rare and auricular fibrillation set in later than in comparable cases with mitral stenosis. Harken and also Bailey have constructed an interatrial window surgically to this purpose, but offer no enthusiastic support for the method. Yet another indirect approach to the management of these patients has been the operation of cardiac sympathectomy. Afferent and efferent connections to the heart are divided following a bilateral removal of the inferior cervical and upper five thoracic ganglia. This procedure was conceived to reduce the heart rate and thereby prolong the diastolic filling interval, the latter at times profoundly contracted owing to the tachycardia often occurring in association with severe mitral stenosis. Inducing tricuspid insufficiency has been tried to relieve the pulmonary congestion of mitral stenosis.[22] This has found few proponents.

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* Arbuthnot Lane acknowledges a more than casual search for an appropriate case in which to relieve the obstruction by notching the mitral orifice.[2]

Interestingly, mitral insufficiency, carrying a prognosis quite as grave as that for mitral stenosis, and often in coexistence with it, has attracted somewhat less the surgeon's attention to its correction. This hesitancy may well arise from the prevailing impression that any thoroughly satisfactory reconstructive procedures upon the heart valves would require a direct-vision approach and also take too long an operative time. Under this philosophy, surgical therapy for mitral insufficiency should best await the perfection of some extracorporeal pump-oxygenator mechanism.[23–25]. The safe clinical use of one of the many types under study seems imminent,[26] and this may have stymied the development of alternative surgical techniques in this field.

Murray in 1938[27] reported on experimentally created mitral insufficiency partially rectified by means of transventricularly positioned and dangling, autogenous, free vein grafts. These were turned endothelial side out and stabilized by a tendon through the vessel lumen so that with each ventricular systole the venous prosthesis flap-valved across the mitral orifice. He reports an adaptation of this method to a few patients in 1950.[28] Templeton and Gibbon[29] have destroyed valvular action in dogs and then restored this function in part with free autogenous pericardial grafts. More recently (1951) Bailey and associates[30] have described an adaptation of these methods. A pericardial pedicle, endothelial side out, is tubulized and then pulled through the anterior and posterior walls of the left ventricular musculature, guided by a finger partially inside that chamber, the finger having been inserted into the auricle and past the mitral orifice. The free end of this column of tissue is now drawn out the back wall of the ventricle, fastened in place on both ends, so that adequate slack persists in the chamber. With each ventricle's systolic thrust of blood this flap-valve is pushed into the atrioventricular opening, but is prevented from undue prolapse by its points of fixation in the ventricular wall. The authors report that in three of the cases total control of the regurgitant flow was achieved as measured by the palpatory finger in the auricle.

Various plastic prostheses have been tried experimentally as possible replacements for defective valves as reported by Denton,[31] Campbell,[32] and Hufnagel.[33] No clinical trials have been published to date.

The management of tricuspid lesions is less of a problem. First, there are fewer instances of severe involvement in that organ. Second, the consequences of involvement are rather less suddenly grave. Finally, those measures sufficient in the mitral area should prove reasonably effective with minor modifications in the tricuspid region. On the other hand, aortic valvular lesions continue to resist rather annoyingly the enterprise and imagination of experimentalists and clinicians. The proximity of coronary ostia which must be kept patulous, the position of the stenotic valve largely surrounded by thickly hypertrophied cardiac musculature, and finally, the substantially larger blood loss involved when the avenue of operative approach is through the tensely filled left ventricle—all are technical obstacles hampering a direct surgical approach to the stenotic aortic valve. Glover and his associates[34] confirmed clinically the disastrous consequence of converting a tight aortic stenosis into an insufficiency. The cutting method tried was patterned after the Brock technique for pulmonary valvular stenosis.[35] In subsequent cases these workers have explored the tolerance of a patient for, as well as the therapeutic benefits of, aortic valvular dilation after examining various other techniques experimentally.[36] Through an opening in the cervical portion of the carotid artery, a pencil-like gadget is slipped down the vascular tree until it engages the narrowed aortic valvular stoma. Activated by a screw head which is manipulated by the operator, the fluted tips are gradually expanded until this device tears apart the fused aortic valvular leaflets. All maneuvering is necessarily blind and at a distance. Despite this limitation, a few trials have been reported and some successes realized to date.

TECHNIQUE OF SURGERY FOR MITRAL STENOSIS

The technical aspects described in this presentation have been slowly and gradually evolved both from the experiences of others[37,38] and from our own. When we first began this series of patients, many drugs were used preoperatively and during surgery. Currently most of these have been abandoned, so that now digitalis and topical or systemic procaine hydrochloride, plus the usual preoperative medications, are solely those used. Occasionally quinidine has been of value in an attempt to alter cardiac irregularities or excessive apical rates. Diligent efforts are made to dehydrate these patients immediately before operation by the use of diuretics plus fluid and sodium limitation.

Preoperatively every attempt is made to prevent the development of tachycardia. If the patient is unduly agitated, sedation is administered generously. On one occasion severe tachycardia developed during the induction of anesthesia and precipitated a bout of hemoptysis. The operation was postponed, but eventually carried through successfully (Case J.B.) with the use of a "sneak type" anesthesia. Pentothal was administered on the ward, without apprising the patient of the imminence of surgery. It is suggested that this approach perhaps might prove useful in cases that are poorer risks and that exhibit pronounced excitation prior to surgery.

A well-functioning intravenous infusion is of utmost importance when the mitral valve is being operated on. In addition to its use for blood transfusions during surgery, it is of value as an avenue for administering the anesthetic agent during the induction. Hypotension has been a common occurrence in our patients as anesthesia was begun, as well as during the early phases of the surgical procedure, and is probably related to the peripheral vasodilation of anesthesia in a patient possessing a rather fixed cardiac output.

We have tried, with about equal success, both a left anterolateral incision through the third interspace with the patient essentially supine, and also the lateral approach with the patient on his right side. Through either approach an adequate exposure is paramount for this operation. Minimal retraction of the lung is used, to ensure the maximum ventilation possible. With the chest open and through a small incision in the pericardium, this sack is flooded with 1 per cent procaine hydrochloride, which is allowed to act for five minutes. After the pericardial slit has been enlarged widely, its edges are retracted by circumferentially positioned silk sutures long enough to be led well out of the field. The heart is carefully inspected. The presence of excess auricular activity during ventricular systole should suggest the possibility of regurgitation. The heart is then gently palpated. A thrill only during ventricular diastole and over the left ventricle immediately below the atrium suggests the valvular lesion is preponderantly a stenotic one. On the other hand, a thrill in this area and predominating during ventricular systole is suggestive of mitral regurgitation. The location of the thrill on the external ventricular surface contributes also a clue to an eccentrically positioned mitral valve opening. With one finger in the transverse sinus, an associated aortic valvular lesion of stenosis or regurgitation may be considered possible if there is a thrill in this area.

At all times particular care is exercised lest one dislodge an auricular thrombus. Harkens suggestion to carry out all initial maneuvers on the atrial appendage while maintaining occluding pressure bilaterally on the carotids seems sound. To have followed this suggestion might have prevented the cerebral embolization in our one fatal case. With a purse-string suture of 00 oiled silk inserted at the base of the auricular appendage, a right-angled clamp is closed just distal to this line, and the tip of the appendage is amputated. The inside of the appendage is cleared of thrombi and/or bands down to the base, so that an index finger may be introduced easily. This digit is inserted slowly into the heart, as the right-angled clamp is loosened and the purse-string snugged down. Haste has little role in this operation. The opening in the auricular appendage is so tailored that the finger will act as an obturator during the intra-atrial examination. Now the character and size of the stenotic opening is determined, and the degree of any regurgitant jet assessed. The interatrial septum is palpated for any possible associated defects. Gentle pressure is applied on the commissure nearest the left ventricular wall (anterolateral), and disruption may occur rather easily along the line of the fused cusps. This opening is enlarged at intervals of a few seconds to permit withdrawal into the auricle of the finger so that ventricular filling may proceed, and also to check for any developing valvular insufficiency.

If real difficulty is encountered in finger-fracturing this commissure, an appropriate valvuloplasty knife is introduced along with one's finger, and this guillotine instrument carefully hooked around the free edge of the valve before an incision is made in the conjectured site of the commissure. With the knife providing a directional split of the valve, an ample digital enlargement of this opening is usually a simple act. Occasionally the auricle is too small or full of thrombus, and the site of entrance must be through a pulmonary vein.

To conclude this phase of the operation, the open end of the appendage is then oversewn with a running, fine-silk suture, and the purse-string is drawn tight while the auricle-occluding clamp is removed. A few stitches lock the pericardial edges together as a buttress over the area of the auricular appendage. The remainder of the pericardial incision is left open to avoid tamponade. All lung tissue is carefully re-expanded, precautions being taken to leave no residual atelectatic zones after obtaining a biopsy. Two rubber intercostal catheter drains are positioned high and low in the chest, which is closed in layers.

POSTOPERATIVE CARE

In addition to the customary care given a patient with a thoracotomy, particular attention is devoted to ameliorating the degree of incisional pain. Various types of local blocks have proved beneficial and seem to slow somewhat the usual postoperative tachycardia.

Fluids are given so sparingly as to dehydrate slightly these patients. Occasionally nasal suction has been necessary to relieve gastric dilatation, which can provoke a rapid heart rate.

In the younger age group it was found possible to permit a rather early resumption of an increasing scope of physical activity; in some the resumption could not have been prevented. However, in the older group (aged 40 to 50 years), only a more gradual reintroduction to exercise was tolerated.

CASE MATERIAL

To date—between June 28, 1950, and August 30, 1951—14 patients, considered before surgery to have mitral stenosis, have been operated upon. Approximately the same number of cases have been seen in surgical consultation during this period and an operation considered unwise. Only one patient was turned down for valvuloplasty because of her age. None have been refused because of the severity of the cardiopulmonary disease process save where the mitral stenosis has occurred in association with an aortic lesion or a mitral insufficiency of ominous proportions.

Despite a considerable effort to eliminate cases with serious degrees of mitral insufficiency, at surgery 3 cases exhibited a considerable amount of regurgitant flow. Each of these was unimproved or made clinically worse by the operative procedure. There was one death in this group, and this seemed primarily due to unilateral cerebral embolization, first noted in the early postoperative period. Local cervical sympathetic blocks and total heparinization failed to benefit this patient. A thrombus arising in the auricle, but not recognized during the exploratory and manipulative phases of the operation, was undoubtedly dislodged at that time. A subsequent autopsy confirmed the focus of origin.

Small segments of pulmonary parenchyma and the auricular appendiceal tip are regularly turned in to the pathologist for examination and sectioning. The former area has usually presented the microscopic picture of mild to moderately severe chronic passive congestion. In addition, subintimal thickening in the pulmonary arterioles has been noted. No rheumatic activity has been recognized in the histological study of the auricular fragment. Muscular hypertrophy and laminar thrombi have been the sole findings to date.

In order to extract as much information as possible from this study program in patients with mitral stenosis, we have made various types of preoperative and postoperative clinical evaluations (as well as laboratory analyses). The impression is strong that these do represent incomplete appraisals in any given case. For the series, and particularly as it enlarges, trends may persist and be clear enough to serve as policy determinants, it is hoped. Any reasonable effort expended in the development and application of this technique will certainly be justified if it adds even slightly to our ability to advise wisely for the patient with mitral stenosis.

A CLASSIFICATION OF THE STAGES OF THE DISEASE PROCESS

Patients diagnosed as having mitral stenosis are currently assigned to one of four stages; their postoperative status is considered under four possible classes.*

In Stage I the patient is asymptomatic. He carries the diagnosis of mitral stenosis because of physical findings, laboratory, and x-ray data. There is no perceptible physical handicap, and he is kept under scrutiny by a continuing medical follow-up. He is cautioned about the hazards of respiratory infections. Any tendency to bacteremia during a bout with a respiratory infection is actively managed with appropriate antibiotics if he remains under local medical responsibility.

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*These divisions are closely patterned after the classification of O'Neill et al.[39]

Stage II is a very broadly inclusive group of patients, some rather older and in the fourth and fifth decades, but many younger. Their heart disease is now causing symptoms, often has done so, in fact, for years; yet none of these disabilities are intolerable, albeit life has involved certain restrictions. There are few cases one can label categorically by saying, "Operate on this one: don't operate on that one." Perhaps with the development of additional experience and data, one will be able to assure this patient living on the middle ground that the operative risk for him is certain to be low and the likelihood of his securing a large measure of long-term benefit is high. We do not feel that era is yet at hand. Those operative selections we have made from this group have invariably provoked on the part of all physicians an exasperating degree of uncertainty as to the wisest course.

In stage III the selection of a candidate for surgery becomes simpler, for now the patient is approaching a medical crisis. Dyspnea on mild exercise or even virtual invalidism, repeated attacks of paroxysmal dyspnea, recurrent or persistent auricular fibrillation, embolization, bouts of hemoptysis, episodes of congestive failure (requiring bed rest, digitalis, and salt restriction)—all or in various combinations characterize this miserable unfortunate's daily existence. Without surgical relief from an intolerable stricturing in the mitral area, this person is soon doomed. After a satisfactory valvuloplasty, he often demonstrates the possession of considerable functional reserve in the cardiac musculature. Under such circumstances he may eventually recover a large measure of his lost health.

Stage IV is the cardiac, and sometimes pulmonary, cripple with terminal manifestations of mitral stenosis. Often this defect is in combination with another valvular lesion or some cardiovascular degenerative process. Too commonly the situation is quite irreversible because of permanent changes. Perhaps in an occasional person, particularly if he is younger, despite almost total preoperative debilitation, following a satisfactory valvuloplasty all concerned will be deeply gratified by the restoration of wellbeing that has been achieved.

CLASSIFICATION OF POSTOPERATIVE RESULTS

Class 1. The results with patients in this category are designated "satisfactory." The mitral murmur may be still present. There are no residual symptoms. The patients are returned, in effect, to stage I of mitral stenosis.

Class 2. These patients are "improved." Limitations upon exercise persist in varying degrees. Symptoms may persist, but should be less severe and less frequent and should respond more promptly to medical management. The condi-

TABLE I

SIGNS AND SYMPTOMS OF PATIENTS WITH MITRAL STENOSIS TREATED SURGICALLY

	Case Number	Sex	*Dyspnea on Mild Exertion Paroxysmal Dyspnea Orthopnea	Pulmonary Edema	Hemoptysis	Right Heart Failure	Recurrent or Persistent Auricular Fibrillation	Apical Systolic Murmur	Blood Pressure
H.H.	AH 89751	M	5 yrs.	+	−	+	+	+	92/80
M.M.	AH 88725	F	2 yrs.	−	−	−	+	+	120/70
I.K.	AH 63242	F	5 yrs.	−	−	+	+	+	150/90
C.D.	825840	M	1 yr.	−	−	+	−	+	108/74
J.B.	829154	F	4 yrs.	+	+	+	+	+	104/70
B.H.	831696	M	8 yrs.	−	−	−	+	+	100/70
D.S.	831972	F	20 yrs.	+	+	+	+	+	120/70
D.H.	837691	F	3 yrs.	+	+	+	+	+	122/80
G.C.	832874	F	1 yr.	+	−	+	+	+	112/72
H.B.	833378	F	20 yrs.	+	+	−	+	+	120/40
F.K.	816841	F	10 yrs.	−	+	+	+	+	110/70
E.T.	832648	F	15 yrs.	+	−	+	+	+	140/68
N.C.	835156	F	1 yr.	+	+	−	−	−	110/60
D.W.	835385	F	15 yrs.	+	−	−	+	+	115/100

*One or more of these symptoms present.

TABLE II

PRE- AND POSTOPERATIVE CATHETERIZATION STUDIES

		PRE-OPERATIVE				POSTOPERATIVE		
	Age	Pulmonary Artery Pressure (mm.Hg)	Right Ventricle Pressure (mm.Hg)	Cardiac Output (L/min.)	DATE OF SURGERY	Pulmonary Artery Pressure (mm.Hg)	Right Ventricle Pressure (mm.Hg)	Cardiac Output (L/min.)
H. H. A89751	48	60/30	60/0	3.5	6-28-50	35/10		4.7
M. M. A88725	22	28/20	30/6	8L*	8- 2-50	20/10	25/6	5.9
I. K. A63242	47	25/10	28/0	3.75	11- 8-50			
C. D. U825840	16	55/15	50/-5	4.1	12-26-50	45/38	60/0	5.48
J. B. U829154	25	105/40	105/0	2.75	2-23-51		65/10	3.88
B. H. U831696	43	35/18	35/0	4.8	5- 4-51			
D. S. U831972	43	25/16	19/0	4.17	6-20-51			
D. H. U837691	40	50/30	40/0	3.89	6-21-51			
G. C. U832874	29				6-24-51	35/18	35/0	3.4
H. B. U833378	47	35/15	35/0	4.7	6-26-51	25/12	30/0	2.5
F. K. U816841	46	18/10	25/0		7-17-51			
E. T. U832648	43	60/35	80/0	3.88	8- 1-51	50/30	48/5	3.7
N. C.† U835156	28				8-21-51			
D. W. U835385	48	40/20	35/0	3.1	8-30-51			

*This laboratory determination was hard to rationalize with the clinical symptoms and history of dyspnea on slightest exertion.
†Catheterization attempted. Patient developed cardiac arrest and nearly succumbed. After recovery she was operated upon without catheterization.

tion corresponds to some of the milder degrees of involvement listed under stage II of the disease. In other words, these patients are now in the group we should have been unlikely to recommend for operation if they had had only this degree of involvement when they originally presented themselves.

Class 3. The patient in this category has been unimproved following surgery whether he started in Stage II, III, or IV. The treatment has been unsuccessful and perhaps ill advised.

Class 4. The patient died during or within a reasonable time after the operation.

On the basis of these values, crude as they surely are, our material has been analyzed with an intent to be critical of the end results. This information is provided in tables I, II, III and IV, with supplementary comments and explanatory notes. It is only realistic to indicate that the distribution in the summary table IV may be partially invalidated at a future follow-up by transitions between the several classes.

DISCUSSION

A group of patients, the first operated upon for mitral stenosis at the University of Minnesota Hospitals and at Ancker Hospital in St. Paul, have been studied on the basis of both preoperative and postsurgical clinical judgments as well as from the data calculated from cardiac catheterization studies. To date, it has been as easy to select the cases most likely to benefit from an operation on the basis of the patient's medical history and his physical findings. A comparison between determinations of the right ventricular pressure, the pulmonary artery pressure, and/or the cardiac output before and after operation shows results that agree poorly at times with the patient's general health and with his postoperative physical activities. This is evident from tables II and III. The best and most obvious clinical results are not in good agreement with certain predictions based on changes in these laboratory data secured after surgery. An inexperience with the techniques involved would

TABLE III

PRE- AND POSTOPERATIVE CLASSIFICATION OF CASES

	Pre-Operative		Date Of Surgery	Postoperative		
	Stage	Remarks		Mitral Murmur	Class	Remarks
H. H.	3	Possible aortic stenosis diagnosed. Auricular fibrillation. Hemoptysis. Limited activity.	6-28-50	+	3*	Aortic lesion may be complicating picture. Requires digitalis, low salt diet and mercurial diuretics as well as a limited activity. Some improvement in physical activity realized with this medication since valvuloplasty.
M. M.	2	Dyspnea on minimal activity with an increase promptly to severe dyspnea on moderate exercise. Auricular fibrillation.	8- 2-50	+	1	One pregnancy since surgery. One attack of transient pulmonary edema since valvuloplasty. No subsequent episodes. Can now walk considerable distances without shortness of breath.
I. K.	2	Auricular fibrillation and congestive failure prior to surgery. Some exercise limitation.	11- 8-50	+	3*	Manic depressive. Subsequently given electroshock therapy. Subjectively, professes considerable increase in physical activity scope, postoperatively.
C. D.	3	Attacks of cyanosis. Progressive intolerance to exercise. Virtually bedridden.	12-26-50		2	Some slight dyspnea while playing baseball but generally much improved.
J. B.	4	Repeated hemoptysis and auricular fibrillation. Bedridden with complete incapacitation. Gravely ill at best periods.	2-23-51	+	1	Climbs steps to second floor many times daily. Dancing and similar activities well tolerated. No symptoms. Virtually no limitation of exercise.
B. H.	3	Worse during past year with substernal pressure type pain resulting in an inability to do work. Auricular fibrillation.	5- 4-51	+	3*	Emotional aspects complicated convalescence due to rather severe psychoneurosis. Calcific mitral disease with pronounced regurgitant element.
D. S.	3	Repeated bouts hemoptysis. Probable cerebral embolus with recovery. Considerable incapacitation. Auricular fibrillation.	6-20-51	+	†	Died. Embolus to right hemisphere. Early heparinization and anesthetic blocks without avail.
D. H.	3	Regurgitation strongly suspected with grade 3 apical systolic murmur. Hemoptysis and auricular fibrillation.	6-21-51	+	3*	Pronounced regurgitation at surgery. Patient subjectively improved but surgeon considered operative procedure to be noncontributory.
G. C.	3	Auricular fibrillation. Steady deterioration of cardiac status during past year. Marked limitation physical activity.	6-24-51	+	1	Plays basketball. Now has few physical limitations.
H. B.	3	Splenic infarct. Auricular fibrillation. Incapacitated for work (nursing) past 4 yrs.	6-26-51	+	2	Suffers recurrent attacks paroxysmal auricular fibrillation with hemoptysis. Improvement between attacks of her exercise tolerance and can now work.
F. K.	3	Auricular fibrillation. Hemoptysis. Right heart failure. Hydrothorax.	7-17-51	+	1	Able to do heavy housework. No cardiac disability outwardly manifest.
E. T.	3	Cough for many years. Ankle edema recurrently. Orthopnea. Very limited exercise tolerance. Auricular fibrillation.	8- 1-51	+	2	Second month postoperative had an attack of congestive heart failure. Responded well to bed rest. Some improvement for exercise ability. Marked mitral regurgitation present postoperative.
N. C.	3	Paroxysmal nocturnal dyspnea. Severe respiratory distress. Virtually bedridden.	8-21-51	+	2	Much improved postoperatively. Is up and about. Some dyspnea after climbing three flights of stairs.
D. W.	3	Hemiplegia and aphasia 1947-48 with recovery. Congestive failure with pregnancy. Bedridden 3 months prior to operation. Auricular fibrillation.	8-30-51	+	2	One attack of pulmonary edema after a respiratory infection. On reduced physical activity now, but can be up and about. Definitely improved.

*Regurgitation great at operation. No valvuloplasty done.
Improvement has been obtained in each of above cases probably on psychiatric basis.
†Died.

TABLE IV

RESULTS

Summarical Table

Stage	Number	Class			
		1	2	3	4
2	2	1		1	
3	11	2	5	3	1*
4	1	1			

One worse, three unimproved, all the latter had regurgitation at surgery.
*One patient died.

seem to be only a partial answer to this humble beginning. That considerable skill and great technical precision are essential during all cardiac catheterization studies is now even more obvious, if data able to survive critical comparisons are to be recorded. Applying this censure to ourselves, we acknowledge that diagnostic auscultatory and radiologic errors were made in three cases. Each of these persons harbored an appreciable mitral regurgitation, as confirmed at surgery, and though it was associated with some stenosis, they gained few advantages, if any, from an attempted valvuloplasty. Though the failure to benefit them could as conceivably have been an operative defection, this opinion seems less sound since corresponding failures did not occur in patients equally ill but without a mitral reflux.

Approximately two out of every three patients who underwent surgery got marked relief from the operation.* In order neither to deny the operation to those who might benefited by it nor to urge it unnecessarily, it is highly essential that we improve our discrimination techniques. It is at the extremes of this disease complex, with our patient either very sick or very healthy, that one can most easily err. In brief, there can be little quarrel with the selection for surgery of a young adult gradually succumbing to a lingering illness, relatively uncontrollable by all the variants of medical management. There is, however, a reasonable reluctance on the part of many clinicians to be persuaded that the diagnosis of mitral heart disease should indicate a cardiotomy for exploration as to the type and degree of "heart disease," as has been seriously suggested. Our hesitancy on this score stems in part from a recognition that with the most favorable clinical results, and in the experience of many surgeons, there is yet present, upon auscultating these patients, the pathognomonic cardiac rumblings of mitral heart disease. Most people with mitral stenosis know of their "heart disease" and hence are often earnestly desirous of finding benefits from this operation. In this group, to depend on a purely subjective analysis of alleged benefits, is to abandon science for hearsay. Our future progress, and the patient's best interests, rather seem to lie, in the direction of expanding clinical and physiologic techniques so that a more reliable appraisal before and after surgery may become possible. A careful and sustained follow-up of these measurements, particularly where there is any apparent regression of benefits, may be invaluable in the chronicling of data from which posterity can derive guidance.

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The symptoms of acute rheumatic fever are controlled dramatically by corticotropin when given at the earliest possible time in an initial daily dose of between 1 and 2 I.U. per pound of body weight. In a study of 18 children between the ages of 3½ and 15 years suffering from initial attacks, it was found that amounts above and below these figures were wasteful of the drug and hospital days. No residual indication of cardiac damage was detected in 13 patients; grade 1 mitral systolic murmurs were noted in 5. Increasing evidence suggests that morbidity may be reduced and the characteristic biochemical aberrations of the active phase shortened by intramuscular corticotropin therapy.

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Clinical Report on Family Planning

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In our clinic, instruction on family planning is given to women who request such advice at premarital or postpartum examination, who are referred for this information because of medical indications, or who have a contraindication to an immediate pregnancy. This report presents the results of a study of such patients to learn whether they followed the advice and how they used the method recommended. In this paper we report only those patients using a single method of conception control, the gel alone without a vaginal occlusive device. In a previous paper[1] we published a two year investigation of this new preparation, Preceptin vaginal gel,* in which we studied the dispersion properties and effects on vaginal tissues in addition to its effectiveness as a contraceptive. This study includes further follow-up data with analysis of this group as well as on other new patients admitted to the study.

This survey was compiled June 30, 1952. The follow-up data were accumulated through this date on all patients receiving the gel for the first time from August 1, 1949 through December 31, 1951 as follows: the histories were carefully and critically analyzed, patients not seen frequently or recently were contacted personally by the physicians or nurses of the clinic, and a questionnaire was sent to four hundred of the patients.

The series consisted of a total of 774 private patients. In an active obstetrical practice the physician recommends or is asked frequently by the postpartum patient for advice about family planning or spacing their children, and premarital patients request information about conception control at the time of their examination. In this report we will analyze these two groups separately so that a more detailed study of each may be presented.

Factors such as religion, education, economic level, age, number of living children, and duration of marriage play a part in an individual's use of any method for the control of conception. In our study it was found that the majority of patients were Protestant, 16 per cent Catholic, and 1 per cent Jewish. This contrasts with the study by Guttmacher and his coworkers in which 52 per cent were Catholic, 43 per cent Protestant, and 5 per cent Jewish. It is of interest to note that all of the husbands of these women were engaged in work that required some degree of education, training and skill. Many owned their own farms or business, some were executives, some had a profession such as physician, lawyer, minister, teacher, and many were students at local colleges.

A history was taken on every patient receiving advice on planned parenthood, and a thorough pelvic examination was performed before recommending a method of conception control. When given the gel only method with applicator the patient was shown use of the applicator by demonstration with a pelvic model, and was required to insert the applicator herself while in the office so that the physician could observe that she did it correctly. Although the gel alone is simple to use, in many instances it was a new procedure for the patient. We agree with Stromme[2] that it is important for the physician to instruct the patient how to introduce the applicator filled with the gel so that the material will be deposited at the cervix, and how to direct the applicator toward the cervix in the case of a marked retroversion; to stress the importance of the use of an applicator full of the gel before each act of coitus and another before repeated coitus; and to point out that a douche need not be taken, but if it is used must never be done before six to eight hours after coitus.

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*Ortho Pharmaceutical Corporation, Raritan, New Jersey.

The average age of all the patients in this report was 25.2 years, the youngest being 15 and the oldest 45 years (table I).

TABLE I

AGE DISTRIBUTION

Age of Patient	Number of Patients
15 to 19	79
20 to 24	305
25 to 29	195
30 to 34	105
35 to 39	33
40 and over	15
Unknown	42
	Total 774

The average age of the husbands was 28.7 years. Data concerning the findings at the time of the pelvic examination were available from the histories in 90.3 per cent of the cases. In 490 patients the examination was negative. The number of times each pelvic condition was found is shown in table II.

TABLE II

PELVIC EXAMINATION FINDINGS

Relaxed vaginal outlet and or cystocele, rectocele	20
Laceration of cervix	13
Cervicitis	7
Erosion of cervix	31
Retroversion of uterus	107
Retrocessed uterus	2
Descensus uteri	2
Congenital malformation of uterus	2
Myoma uteri	8
Endometriosis	3
Ovary (prolapse, cystic)	6

The total number of 774 patients can be classified into two groups, namely, those receiving instruction in the method at the time of their premarital examination, and those who had been gravid one or more times before receiving it for the first time. The remaining portion of this paper will present detailed data concerning these two groups separately.

PREMARITAL GROUP

In the total group there were 149 patients who were examined and given advice either just before or immediately after marriage. The average age of this premarital group was 22.6 years, the youngest patient being 18 and the oldest 40 years.

Detailed data will be given on 58 of these patients. The other 91 patients cannot be included, for follow-up data were not obtainable or the patients had never returned after their first visit to the Clinic. Some were wives of students attending local colleges so they did not live in the city, or lived here only during the school term. Many of the group moved following marriage.

Authors[2-4] of articles reporting studies on various methods of contraception have eliminated in their reports patients who have used the method less than six months so that half-hearted and irregular users would not be included. Or, they have not counted patients as active users until they had had at least two regular menstrual periods after being supplied with the method, thus eliminating patients pregnant at the time they were supplied or patients only mildly interested who contemplated use of the method rather than actually employing it.

Twenty-two cases of this premarital group of 58 fall into the classification of individuals using the method less than three months, so have been excluded as explained above. Eight of these patients never used the method at all and seven became pregnant; six patients used it one month or less and three reported a pregnancy; and eight patients used it two months and one reported a pregnancy.

This leaves 36 patients in this group. Eighteen used the gel successfully for 3 to 35 months. Seventeen used it successfully for the same period of time and then had a planned pregnancy. There was one patient with an unexplained pregnancy who claimed regular and correct use of the gel alone and became pregnant after using it for six months. Table III shows the time the method was used as well as the age distribution of the patients.

TABLE III

DURATION OF USE — PREMARITAL GROUP

Months	Number of Patients	Age Distribution
3 to 5½	13	19 to 28
6 to 12	11	19 to 40
12½ to 18	3	18 to 27
18½ to 24	7	18 to 22
35	1	30
	Total 35	

Table IV presents the months the method was used before its use was stopped to plan a pregnancy, and the age distribution of patients. Patients reported that they became "pregnant at once," or had only one to three menstrual periods (one patient having 6) before conceiving after discontinuing the use of the gel for a planned pregnancy.

TABLE IV

DURATION OF USE

PLANNED PREGNANCIES — PREMARITAL GROUP

Months	Number of Patients	Age Distribution
3 to 5½	8	20 to 28
6 to 12	5	19 to 30
12½ to 18	1	20
18½ to 24	2	18 to 26
35	1	30
	Total 17	

Comments made by the 36 patients in this series who had used it for three months or more showed that they found it satisfactory, convenient, simple, and easy to use, and those who had pregnancies asked for it again after delivery. One patient complained of some irritation, but she used the method for twelve months, stopped using it for a planned pregnancy, conceived at once, and has been using the gel again since her delivery.

POSTPARTUM GROUP

There remain 625 patients who had had one or more pregnancies before receiving the gel as a method of conception control. There is always a group of patients that fails to return or on whom further follow-up data cannot be obtained. Some patients move away, some live too far away to return for frequent office visits, others obtain elsewhere the material recommended, and some never reply to questionnaires. There are 241 patients about whom we have incomplete or no information as to their use of the product, so the following detailed data are presented for the 384 patients on whom we do have follow-up information.

The average age of the 384 patients is 26.1 years, the youngest being 15 and the oldest 45 years. The average number of times the patients were gravid in the total postpartum group (including 183 abortions) was 2.08 per patient before receiving the gel alone method (table V).

TABLE V

PREGNANCIES BEFORE ADMISSION TO SURVEY

Number of Pregnancies	Number of Patients	Total Pregnancies
0	149	0
1	211	211
2	235	470
3	110	330
4	42	168
5	11	55
6	5	30
7	1	7
8	1	8
9	1	9
Unknown	8	
	Total 774	1288

From the histories, data concerning methods for the control of conception used by the patients prior to receiving the gel alone were available on 165 patients. Of this number, 25 patients said they had never used any method. There were 121 patients who said they had used the diaphragm and jelly method, 39 stating that they had planned their pregnancies (1 to 4); 38 patients had used the diaphragm and jelly method but no information was available as to whether or not the pregnancies (1 to 3) had been planned; and 44 patients reported that they had unplanned pregnancies (1 to 8, for a total of 113 pregnancies) while using the diaphragm and jelly method as directed.

There were 19 other patients who used the following methods: 10 used condoms (6 had unplanned pregnancies, 1 to 3) 5 practiced rhythm (4 had unplanned pregnancies, 1 to 2); and 4 used other methods, suppositories, douches or unknown (3 had unplanned pregnancies). The gel alone method was preferred by most patients because it was simple, convenient to use and more natural, although two said it was messy, and one said it was too much trouble. Two of the patients preferred the diaphragm and jelly method for they felt more secure with its use. One patient reported irritation with the use of the gel, one other stated that she occasionally noted some irritation, and in one instance the husband complained of irritation.

Of these 384 cases, 132 cases merited additional analyses. Forty-eight of these 132 have not become pregnant since using the gel but cannot be included for the following reasons: 16 used it for one month or less, 20 for two months, and 12 other patients never used the method for the following reasons: 5 wanted a baby (conception has not yet occurred, 1 to 6 months) 2 refused to use any method, 2 did not like the method, and 3 gave no reason.

There was another group of 84 patients with pregnancies, but they had never used the method or had not used it as directed. Comments received from these patients were so informative that they are listed below.

1. One couple used condoms instead, but after delivery asked for and uses the gel alone method.
2. One couple practiced withdrawal instead.
3. Four patients used the rhythm method instead, one of these feeling the gel alone was too much trouble to use, another saying she really preferred the method and after delivery asked for and is using it.
4. Six patients used the method only a few days each

month, the patient herself deciding when she thought she might be fertile.

5. Three patients used the method incorrectly — douched immediately after coitus, or did not use a full applicator of the gel.
6. Four patients inserted the gel either after completion of coitus or interrupted coitus to introduce it.
7. Eight patients ran out of supplies. Until that time three of these patients had used the gel alone for 6, 8, and 11 months respectively; the length of use by the remainder is unknown.
8. Sixteen patients deliberately stopped using the method, reason not given. These patients had used it for the following number of months respectively: 1, 2, 2, 3½, 4, 5½, 6½, 7, 8, 9, 9, 10½, 18, and three unknown.
9. Twenty-two patients used the method irregularly. One patient used it irregularly because of religious beliefs; another said it was too much trouble to use it regularly; ten report using it regularly since their deliveries.
10. Nine patients never used the method for various reasons, such as that they wished to douche after coitus and did not feel that a douche could be used; messy; never intended to use any method.
11. Ten patients did not use the gel every time coitus occurred. One patient said she was just careless, and two patients had used it 6 and 19 months before discontinuance of regular use.

There were 9 patients reporting regular and correct use of the gel alone for six or more months who became pregnant. In table VI the time the method was used before the pregnancy and the ages of the patients are shown.

TABLE VI

DURATION OF USE

Months	Number of Patients	Age Distribution
9	2	30, 30
10	1	Unknown
11½	2	27, 27
12	1	25
13½	2	27, 28
18½	1	23
	Total 9	

Data concerning the time the product has been used as well as the age distribution of remaining 252 patients in this group are shown in table VII. Three patients have been using the method for longer than 24 months (25, 30, and 35 months respectively).

In our group of 384 patients there were 75 planned pregnancies. Since this is such a large group of patients, detailed data concerning it are presented separately in the next section.

POSTPARTUM PLANNED PREGNANCY GROUP

There were 75 patients who used the gel alone regularly until they decided to have another pregnancy and then stopped using it for a planned pregnancy.

TABLE VII

DURATION OF USE — POSTPARTUM GROUP

Months	Number of Patients	Age Distribution
3 to 5½	59	17 to 37
6 to 12	119	16 to 40
12½ to 18	40	18 to 45
18½ to 24	31	21 to 40
24½ and over	3	22 to 2 unknown
	Total 252	

The average age of these 75 patients was 25.5 years, the youngest being 17 and the oldest 38. The average number of pregnancies was 1.7 per patient before receiving the gel alone method. The pelvic findings at the time of examination when the patient first received the gel alone, as well as the months used by the patient before stopping the use of the gel to plan a pregnancy, are shown in table VIII.

TABLE VIII

PELVIC FINDINGS

PLANNED PREGNANCIES — POSTPARTUM GROUP

Condition	Number of Patients	Months Used
Cystocele and rectocele	2	11½, 13
Vaginitis	1	19½
Laceration of cervix	1	6½
Cervicitis	1	12½
Erosion of cervix	1	3½
Retroversion of uterus	9	5, 6, 6½, 7, 7½, 8, 12, 24
Bicornuate uterus	1	6

There were nine cases eliminated because they had not used gel for six or more months although these patients stated that they had definitely planned their pregnancy. In three of these cases the length of time the gel had been used was unknown, two cases used it for one month, and four cases used it for two months.

The remaining 66 patients used the method regularly from 3 to 24 months and then stopped using it to have a pregnancy. After stopping use in order to plan a pregnancy, conception

TABLE IX

DURATION OF USE

PLANNED PREGNANCIES — POSTPARTUM GROUP

Months	Number of Patients	Age Distribution
3 to 5½	13	20 to 37
6 to 12	27	20 to 38
12½ to 18	15	18 to 32
18½ to 24	11	21 to 29
	Total 66	

occurred immediately or within two months, which is the same as was observed in our previous study. The length of time the gel alone was used before a pregnancy was planned is shown in table IX.

Following delivery the method was again used. There were no complaints, no irritation, and both husband and wife found the method convenient to use. It is of interest to note that the patient with the bicornuate uterus and one patient with retroversion of the uterus each had two planned pregnancies, using the gel alone both times for the spacing of their pregnancies.

DISCUSSION

The majority of patients in our clinic receiving advice on conception control are postpartum, and since they are in the midst of planning their families many request the advice from the point of view of child spacing. Therefore our observations and presentation may differ somewhat from those of investigators reporting studies on various methods of conception control used in different types of clinics.

In computing the number of true failures the exclusion of the previously mentioned categories is fraught with some danger no matter how unprejudiced the investigation. Gamble[5] has pointed out that if the irregular users who become pregnant are excluded so should the irregular users who do not become pregnant. We have attempted to do this in our questioning. One is impressed by the number of claimed "true failures" who subsequently admit they ran out of supplies the month pregnancy occurred. As a matter of fact, 3 patients in the group of 10 considered true failures subsequently made such an admission but this failure rate was allowed to stand as our information as of June 30, 1952 was such when the charts were read.

We have received some criticism on our previous study to the effect that we were persuading physicians who were satisfied with a method, such as diaphragms and jellies to switch to gel alone technique. We should have to plead guilty to having enthusiasm for this method simply because of our experience with it. In our practice we prescribe the gel alone principally to newly married couples, postpartums who have used no particular type of contraceptive and to diaphragm or condom failures. We certainly do not persuade any one who is using the diaphragm with success to change.

In our three years of observing the results of this study we have been impressed by the speed with which couples achieved planned pregnancies upon discontinuing Preceptin and with the experience of certain multipara who have had repeated diaphragm or condom failures but did not conceive when using Preceptin. Stromme cited similar experience in his studies.

The statistical method used to calculate the pregnancy rate is to multiply the number of pregnancies by 1200 and divide by the number of womanmonths of exposure. In order to make this report comparable with other published data, the pregnancy rate has been calculated on those patients claiming regular use of the method six months or longer. There was a total of 10 method failures, one in the premarital group and 9 in the postpartum group. In our clinic the method has been used for 2881.5 womanmonths by those patients who used it six months or longer. The pregnancy rate per 100 patient years of exposure is 4.16 for the method failures in this group.

SUMMARY

Clinical data have been presented in this paper on a large series of private patients using a single method of conception control. We have reported findings on two groups of patients, those receiving the method at the onset of marriage and those postpartum after having had one or more pregnancies previously.

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The effects of thiocyanate in hypertension depend less on quantitative dosage than on individual blood levels of the drug, rapidity of excretion, and possible action through an indirect humoral mechanism. Amelioration of symptoms and depression of blood pressure occurred shortly after satisfactory concentrations were attained in the majority of 19 patients observed at Johns Hopkins University for as long as four years.

Later relief was more variable. Usually the initial dose of potassium thiocyanate is 0.3 gm. and the maintenance amount is from 0.3 to 0.6 gm. a day, although from 0.15 to 1.3 gm. may be employed.

Caroline Bedell Thomas: Ann. Int. Med. 37:1061-122, 1952.

The University and Medical Research

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This is Centennial year at the University of Minnesota, and this too is a red letter day in the history of the University. We are met to honor two of our colleagues, whose work has brought honor to the state of Minnesota and the University, as well as distinction to themselves. In 1950 the Nobel Prize Committee of the Caroline Institute in Stockholm, following the instruction of the Code of Statutes of the Nobel Foundation in selecting the most important discovery in the domain of physiology and medicine, chose a clinician and two chemists as recipients of this copingstone of all scientific awards. Two of these recipients have been Minnesotans for long years and members of the graduate faculty of the Mayo Foundation: Dr. E. C. Kendall, well-known for the isolation of thyroxin, has long enjoyed world-wide renown as a distinguished biochemist; Dr. Philip S. Hench, the foremost student of rheumatoid arthritis in the world, has wrestled with the baffling problem of arthritis for more than two decades. The other recipient participating in the award is Dr. Tadeus Reichstein, distinguished organic chemist of the University of Basel, in Switzerland.

THE ACCOMPLISHMENT

The whole world applauds this selection of the Nobel Prize Committee. The exciting story of the great discovery will be told and retold to generations of scientists and medical students yet unborn. Anyone who has seen the dramatic film of how cortisone loosens up and relieves the pain of spastic joints in arthritic patients can begin to appreciate the great significance of this discovery. As the multiude, almost twenty centuries ago, "marvelled and glorified God, which had given such power unto men" when they saw the Great Master say to a man sick with the palsy: "Arise, take up thy bed, and walk," so we too now, find it a duteous pleasure to acknowledge with reverent homage this important service to mankind.

The winners of this accolade, I am certain, would be the first to admit that their discovery has by no means resolved completely the difficult problem of arthritis. It has, however, lit a candle in the dark recesses of our ignorance concerning this disease. Moreover, their observations have opened our eyes to the existence of functions of the adrenal glands, undreamed of previously.

There is one facet of this joint research which especially merits our notice. More than twenty years ago, Dr. Hench noted that patients with rheumatoid arthritis exhibited improvement during the course of jaundice; later he observed that pregnancy ameliorated temporarily the disability of the disease as did also anesthesia and operation. And finally, as in the Vision of Sir Launfal, Dr. Hench found the remedy he had spent almost a life-time in seeking at his very door, in Dr. Kendall's laboratory. While Dr. Hench had been contemplating the nature of rheumatoid arthritis, his colleague, Dr. Kendall, had been quietly at work trying to uncover the mysterious function of the small adrenal glands which lie atop the kidneys. Dr. Kendall's magnificent labors in the synthesis of Compound E, or cortisone, provided the key which opened the window to let some light in upon this abstruse problem. And the great help which this effort received from Dr. Sarett and other research chemists of the Merck Company is not to be overlooked. Dr. Reichstein's simultaneous isolation of active adrenal substances, though known by other letters of the alphabet, parallelel and complemented the observation of Dr. Kendall. Inasmuch as almost every new drug or compound is applied ultimately, in an empirical way, to almost every known disease, it is altogether likely that, at some time, cortisone would have been tried by

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*Presented on the occasion of the dinner held at Coffman Memorial Union at which the Regents' Citations were awarded Dr. E. C. Kendall and Dr. Philip S. Hench, Nobel Laureates of the Mayo Foundation and Graduate School of the University of Minnesota, Nov. 28, 1951.

someone in the treatment of rheumatoid arthritis. Now that cortisone has been synthesized and its role in rheumatoid arthritis and other disorders has been ascertained, investigators will go to work to try to discern the nature of the principles involved in this action. The unrelenting search of Dr. Hench for an effective remedy for arthritis shortened the long lag phase for the trial of cortisone for this disorder, certainly by many years. How could one have known that cortisone would have such a dramatic effect upon the painful stiffness and swelling of rheumatoid arthritis? Search, now and then, turns up facts which are stranger than fiction.

THE HIERARCHY OF SCIENTISTS

Now you and I know that this is far from the ideal way in which a research problem should be solved. The first thing to do obviously is to try to understand the functional relationships of the various factors involved; to determine the nature of the problem, and having surmounted these hurdles, to select and to apply the proper remedy. But the truth is that, as often as not in medicine, the problem is resolved in the realistic manner of trial and error employed by the Mayo Foundation observers. In fact, Dr. Hench has said, borrowing a phrase from Winston Churchill, that the mode of operation of cortisone in effecting the dramatic improvement in rheumatoid arthritis is "a riddle wrapped in a mystery inside an enigma."

This method of research in reverse, in which the remedy is found before the principles involved are understood, so common throughout the entire range of medicine, has resulted in placing medical investigators on a rather low rung of the scientific hierarchy. In fact, only those disaffecting completely any suggestion of concern, in public at least, over any teleological objectivity in the research, can be admitted to the sanctum sanctorum of scientific gatherings. Yet, even there, occasionally, whispers of the voice of teleology may be heard.

Now, some of us are not a bit embarrassed over having been seen in the lowly company of teleology. In fact, he can be a delightful as well as a useful companion. Life is a practical matter to most of us. And the purpose of life's voyage is itself an important teleological question. It is not surprising therefore that biologists who deal with life are unwilling to renounce teleologic considerations altogether.

We are told there are hierarchies among the angels; why, therefore, should we despair because of class distinction among scientists? Without wishing to affect the role of even a minor prophet I have the feeling that, presently, the pew-renters of the inner circle of scientists may find it necessary to enlarge their orbit to admit a larger number of medical investigators, even some who come with the tarnish of teleology upon their discoveries.

Three times within recent years, chemists have been recipients of the Nobel Prize in medicine, a circumstance which should serve to focus important notice upon the contributions of chemists to medicine. Will the time ever come when a physician will be a Nobel Prize winner in chemistry, physics or literature? Or win the Peace Award of the Nobel Foundation? Yes, I suppose it is quite proper to pose such a question.

No university has yet completely resolved the problem of the relationship of its professional colleges to their respective professions and society. We need scientists and we need good professional men. Some pretend to be both, as did Benjamin Rush, an American physician of the Revolutionary War period. He said: "Medicine is my wife and science my mistress." To this avowal of a partition of his affections Oliver Wendell Holmes commented caustically several years later: "I do not think that the breach of the seventh commandment can be shown to have been of advantage to the legitimate owner of his affections." Self-righteous critics would probably say the same today.

In extenuation of the biologist's methods, let it be said there are no immutable laws in medicine like those of planetary gravitation, or reactions as fixed as those of two chemicals in a glass beaker. The variables are so numerous, it is difficult to establish criteria of prediction, other than as it relates to large numbers.

The admonition of the Great Master in this regard has some pertinence for us now. At the Last Supper, when the disciples fell to disputing as to who among them was the greatest, the Master said: "If any man desire to be first, the same shall be last of all, and the servant of all."

On the basis of service to mankind, medicine may claim an accomplishment equal in importance to that of any group of scientists. In 1900 the expected life span of a baby at birth was 49 years; today it is almost 69 years. Today, white females live twenty years longer on the average than in 1900; and for males this figure is 17.5 years. Since 1900, the proportion of women attaining the age of 65 years has increased 75 per cent and for men 60 per cent.

And only a beginning has been made. When the full force of these researches which we are celebrating tonight has made its impact upon medicine; when distinguished groups of medical investigators, like the rheumatic fever study group assembled on our campus this week, have exchanged views and enlarged their own understanding by renewed exploration of the subject under scrutiny, employing the experimental method, you may count on it, a considerably improved accomplishment in those spheres will soon become apparent. Foundations, and notably the United States Public Health Service, are giving helpful impetus to coordinated group research in many areas in medicine.

A discovery rarely solves a problem all at once. Five years after discovery of the tubercle bacillus, the impact of the discovery began to be felt. Forty years later, the absorption and integration of the full meaning of the research into many phases of our complex lives suggested definitely that the problem was on the wane. Yet, even today, we still have the problem of tuberculosis with us. And so too with diabetes, infections, and a number of other diseases in which research has made great strides. I see in the audience before me the benign and smiling countenace of Dr. Moses Barron, whose publication in a surgical journal persuaded Dr. Frederick Banting to abandon his practice of orthopedic surgery and to devote himself to the isolation of the internal secretion of the pancreas. How fortuitously ideas originate!

If scientific inquiry finally suggests how we may control arteriosclerosis and cancer—we may then have reason to contemplate seriously the warning of the Psalmist with reference to the age of man. He said: "The days of our years are three score years and ten; and if by reason of strength they be four score years, yet is their strength labor and sorrow." The motivations of men to live and to have their lives prolonged are such that society must and will ultimately find means of dealing with the problems of an aging population.

The public is not in need of enlightenment concerning the value of research. It has learned to appreciate how research accelerates the growth of knowledge. There is no individual living, not even in the most remote corners of the world, who has not benefited in some way by medical research. And no body of knowledge is more intimately concerned with the welfare of man than is medical science. In 1947, John R. Steelman, chairman of the president's Scientific Research Board, stated that the nation as a whole spends approximately $110,000,000 a year on some type of medical research, an amount which is approximately one-tenth of all monies expended on all types of research. It was the recommendation of that committee that by 1957, in this country, $300,000,000 should be spent each year on medical research. Thirty years ago medical research was looked upon as a luxury. Today it is a necessity.

THE NEW ERA IN MEDICAL SCHOOLS IN THE UNITED STATES

It is just 40 years ago since the publication of Abraham Flexner's reproof of the existing conditions in our medical schools. During the latter years of his life, the poet, Oliver Wendell Holmes, was able to persuade C. W. Eliot, then president of Harvard, that his medical faculty needed renovation. However, it was not until Gilman at Hopkins had been able to show the way by the selection for his faculty of a few key men who made the business of the university their chief concern, that a greater interest in truly professional training became apparent in medicine in this country. That process began at this university with the coming of George Edgar Vincent in 1911, and of Dean E. P. Lyon in 1912, but the full impact of the new order was not felt throughout the clinical departments of this medical school until 20 years later. And, under the leadership of Dean Diehl, the medical school has grown considerably in stature. He in turn has had the wise counsel of Deans Ford and Blegen in the graduate school; and in the president's office, successively of Doctors Coffman, Ford, Coffey—and now of Dr. Morrill, for whom we all have great admiration and affection. It might not be out of place even to suggest here that the faculty has thrown in its mite too. Let us hope that the medical school is still adolescent and there is yet room for spiritual epiphyseal growth. Premature ossification whether in bones or universities may make Lilliputians out of potential Brobdingnagians.

And on an occasion such as this, when we come together to celebrate the fruits of productive research, and to acclaim those who placed their important contribution upon the altar of the university and the community, let us commit ourselves, for a moment, to the piety of memory and reflect upon the vision of the brothers Mayo, who, through their beneficence, established the Mayo Foundation branch of the graduate school at Rochester. And at the same time, let us not forget the role of George Edgar Vincent and his Board of Regents. Let us remember always that in universities, communities and nations, decisions are made for us by individuals. A lamb suckles on its knees. And on this calendar Thanksgiving Day, we of Minnesota, yes the peoples of the world, might well bless the memory of the brothers Mayo, Lyon and Vincent, and their associates, who helped bring to fruition the Mayo Foundation affiliation. And on this occasion it is also fitting that we salute Mrs. Waltman Walters, daughter of Dr. William J. Mayo whom I see in the audience and our distinguished guest, Dr. C. W. Mayo, regent of the University and son of his illustrious father, Dr. Charles H. Mayo.

Would these researches have become possible without the affiliation with the Graduate School? Probably not; although it is to be noted that Dr. Kendall had come to Rochester in charge of the laboratory of biochemistry in 1914, and the affiliation of the Mayo Foundation with the Graduate School was not complete until 1917. The spirit of the University breathes something into an undertaking without which it is not quite the same.

I believe it is not out of place to reiterate here that all the potential advantages of the affiliation to both divisions of the Graduate School of the University, or to the Commonwealth of Minnesota, have not yet been realized. It is true, all good marriages are made in heaven. But this celestial beginning is soon supplemented by a terrestrial environment. A portion of every marriage is probably spent in the trials of purgatory; some even descend to the heat of lower levels. There must be few marriages, however, even those in name only, in which there are not some benefits to both contracting parties. The only true gift, however, in marriage or in any other important relationship in life, is a part of oneself, as every receiver learns to know.

In a letter addressed to the Board of Regents of the University of Minnesota accompanying the second gift to the Mayo Foundation, Dr. William J. Mayo expressed in beautiful and simple language the philsophy that had prompted their philanthropy. He said in part:

> "Our father recognized certain definite social obligations. He believed that any man who had better opportunity than others, greater strength of mind, body, or character, owed something to those who had not been so provided; that is, that the important thing in life is not to accomplish for one's self alone, but for each to carry his share of collective responsibility. . . . The fund which we had built up and which had grown far beyond our expectations had come from the sick, and we believed that it ought to return to the sick in the form of advanced medical education, which would develop better trained physicians, and to research to reduce the amount of sickness. . . . The people's money, of which we have been the moral custodians, is being irrevocably returned to the people from whom it came."

Already in 1889, Andrew Carnegie had formulated his philosophy of giving in an article entitled "Wealth" in the *North American Review*. After England's Prime Minister William E. Gladstone expressed an interest in Mr. Carnegie's views, Mr. Carnegie's philosophy came to be known as the gospel of wealth. He said:

> "This, then, is held to be the duty of the man of wealth: To set an example of modest, unostentatious living, shunning display or extravagance; to provide moderately for the legitimate wants of those dependent upon him; and, after doing so, to consider all surplus revenues which come to him simply as trust funds, which he is called upon to administer, and strictly bound as a matter of duty to administer in the manner which, in his judgment, is best calculated to produce the most beneficial results for the community—the man of wealth thus becoming the mere trustee and agent for his poorer brethren, bringing to their service his superior wisdom, experience, and ability to administer, doing for them better than they would or could do for themselves."

There is much in common in the viewpoints expressed by Mr. Carnegie and Dr. Mayo. If this university and its many colleges, including the medical school, are to exhibit continued intellectual and spiritual growth, we must come to look to affluent and influential citizens in this area for support, beyond the great pride of the people of Minnesota in its university, which is expressed in part through the biennial legislative appropriations. Time will judge harshly of the rich men of our communities, whose only concern has been financial and personal gain. The time has come to sound the clarion call to responsible leadership in the support of our institutions of higher learning within the state. An enlightened people assures the greatest strength of communities, commonwealths and nations.

HOW DOES THE SPIRIT OF RESEARCH AND SCHOLARSHIP TAKE HOLD IN A UNIVERSITY?

This important question is one of the chief concerns of educators. No one seems to know the answer. In some areas, where all the conventional rules are followed the plant withers and dies and no amount of care or nurture suffices to supply the needed remedy. The atmosphere certainly must be congenial for the pursuit of scholarship; and, as in planting, seed, soil, cultivation and climate determine in large measure what the yield will be. Go into the departments of the university where important research has been done, and see what made it possible. Look at the records of the two men whom we are honoring tonight. Dr. Kendall spent 24 years with the adrenal glands. The result—cortisone! Was it worthwhile? Well, ask anyone! Dr. Hench spent an equal length of time studying the problem of arthritis. Their joint labors gave the University of Minnesota two Nobel Prize winners, and medicine a tool by which the functions of the adrenal glands can be studied more systematically, in their relation to health and disease.

Inspiration, vision, insight, synthesis, the capacity to educe correlatives, perseverance, zeal, a willingness to concentrate consecutively on the area of endeavor—and not being afraid to pay too heavy a price for one's "whistle"—these are some of the characters which stamp the successful investigator.

Every university should have many productive scholars. But how? In life, as in farming, one frequently has to learn to be content with an imperfect harvest.

The ultimate purpose of the university should be to afford the maximal number of students, undergraduates and graduates the opportunity to develop their latent talents to the utmost. Every man is potentially many men or selves.

None of us are the complete composite selves, we like to believe we are. It is a life-long process to apply the spur to one or two talents to the degree that they exhibit development beyond the ordinary. The "compleat angler," pediatrician, or scientist is a figment of the imagination! If anyone should set himself that goal, in whatever area of endeavor, he would of necessity become a mediocre man, exhibiting a superficial veneer of perfection on several facets. The story of all successful individuals suggests that attainment is a life-long struggle.

The best teachers in the faculty are not necessarily those who have most facts at their command. The teachers which the University should cherish most are those who have the enthusiasm, imagination and capacity to light a candle in another's intelligence and to open the windows of that student's mind to scenes for which his eye previously had no appreciation. The parable of the talents needs to be retold to succeeding generations of teachers as well as students. Yet, of the many young men led to the summit of Mount Pisgah to survey the beautiful vistas which lie in the valleys below, only few Joshuas will come forth to tumble the walls of ignorance by the use of scientific methods, and to drive on into the promised land.

Throughout our lives, we return frequently on the wings of imagination to the dreams of our youth—to the springtime of the world. When we contemplate sadly expectations and hopes unfulfilled, it is easy then to be overwhelmed by a sense of frustration. Not to be lost completely in dreamlike reveries and not to despair; to resolve to go forward and to make the most of what remains—these are the marks of a mature man. Reality—not vain regrets over what might have been—must come to occupy a more prominent place in our thoughts.

Some of you will recall the caricature in the New Yorker of a few years ago, in which two middle-aged ladies were treed by an angry bull in a pasture. Said one to the other: "This might have real significance, had it been a dream."

The Twilight of the Professors and Scientists has been sounded many times through our land. Those universities in which the spirit of research is kept fresh and alive will continue to be the Valhalla of professors who manifest a serious interest in the problems and ills of society. As long as this spirit is felt by the faculty and the students of this university, the "Professoren-Dämmerung" will never be heard here.

PERSONAL REWARDS OF RESEARCH

And finally, I want to mention briefly one of the rewards of research to the investigator. The great paymaster, exceeding the official recognition of governments, the awards of scientific societies, and even the acclaim of devoted colleagues and friends, as is represented in this evening's gathering, is the great joy which comes from the accomplishment. He who has done much for others has done much for himself. To have been useful to one's fellowman and to have earned his gratitude is among the great compensations of life—a usurious and unanticipated luxury dividend from an effort which itself gave great satisfaction. It is the *pursuit* of happiness and the *vision* of fulfilled desire, not their attainment, which give pleasure—and so it is too with research. It is the quest that is exciting and full of promise.

It is fitting, too, that on this occasion we express to the families of Doctors Kendall and Hench our sense of their participation in these researches. To those who gave assistance and encouragement, and helped these men overcome fatigue of the spirit during these arduous years of trial, we are very grateful. And to the wives of younger scholars in the University, who are here tonight, let me say: If your husband displays what would appear to be a disproportionate concern for research, bear with him. He may not become a Nobel Prize winner, but should you insist on having him on your own terms, with little or no time available for study and

(Continued on page 588)

The Reference Function of a Medical Library*

THOMAS E. KEYS, M.A.
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THE REFERENCE FUNCTION of a medical library may be defined as the ways and means the medical librarian has at his disposal to encourage the readers to make the fullest use of the materials of the library.

The primary function of the library, there can be no doubt, is the acquisition and preservation of library materials, and the secondary function, and one certainly of almost equal importance, is the interpretive function or what also might be called the reference function.

ACCESSIBILITY

It is not enough to have books, journals and ephemeral materials in the library, but they must be arranged logically and be easily accessible. In the Mayo Clinic Library, which serves approximately 800 physicians, everything possible is done to make the books thus accessible. Our library is a self-service one and users are free to enter the stacks. Readers are encouraged to go to the stacks and to help themselves to books and journals. The method of arrangement must necessarily be a simple one. The journals are arranged alphabetically on the shelves under corporate entry, and the textbook collection is arranged by subject. In order to achieve greater simplicity, the "dead" collection is separated from the "live" one. This is accomplished by weeding the little-used volumes from the main stacks once a year. The little-used volumes are not discarded, except for duplicate copies, but are kept in a special section where they are available for occasional use. Having the live collection together certainly facilitates its use by readers. In weeding, it is well to keep in mind Oliver Wendell Holmes' dictum: "There is a dead medical literature, and there is a live one. The dead is not all ancient, the live is not all modern."

TEACHING THE USE OF THE LIBRARY

Another method the librarian may offer in the interpretative function is to teach the readers the use of the library. In Rochester this is accomplished first of all by offering the new fellowship men, as they arrive each quarter, an opportunity to view a twenty-minute sound movie which explains in detail the important aspects of the library. Following this demonstration, the fellowship men in groups of two or three make appointments with the librarian for a comprehensive library tour or "book walk." The librarian interviews each fellowship man before the tour to determine his special interests and to answer any questions he would like to raise concerning the library. The tour consists of visits to the catalog, the library stacks, the chief medical indexes and the new book shelf.

One file that receives special attention on the tour is the Mayo Clinic file of authors and subjects. Here a complete bibliography of the periodical contributions by the staff and the fellowship men is maintained. This file is invaluable for answering reference questions and is especially useful for fellowship men who want to become familiar with the interests of their medical chiefs. It is also especially worth their while to consult it when they are preparing materials for seminar discussions.

Following a comprehensive discussion of the medical indexes, the new fellows are shown the special collections. These are: the Reference Section; the Treasure Room which houses our historical books; the Basic Science Room, a large duplicate collection of up-to-date books on the basic sciences; the Browsing Room which contains material of nonmedical interest, and the Mayo Clinic Collection consisting of bound re-

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*Read at the Midwest Regional Group meeting of the Medical Library Association, North Chicago, Illinois, October 6, 1951.

prints of articles by members of the staff, theses by Mayo Foundation fellows, books written by Mayo Clinic staff members, the "Collected Papers of the Mayo Clinic," St. Mary's Hospital Reports, and the "Proceedings of the Staff Meetings of the Mayo Clinic."

SCOPE

A question that is often asked is, "How far should one go with reference work?" Because of the great growth of the medical literature, and since the medical investigator should look up his own references, we have made it a point in the last few years not to offer a complete reference service except in special circumstances. Sometimes it is necessary and important to help the well-established staff members with their references. But younger men, after they are taught how to look up their own references, realize the advantages it offers. In Rochester we encourage the younger men, especially, to write out each reference they read on a bibliographic slip. We use 4 by 6 cards and are finding that this method meets with their approval. This gives the fellowship man an opportunity to keep track of his medical reading.

Keeping references up-to-date, of course, presents many problems. The indexes lag to a remarkable degree. The "Quarterly Cumulative Index Medicus" is about two years out of date, the "Current List of Medical Literature," while it is most useful, it not the easiest tool to use, and other indexes are behind the times. Sometimes I think all medical librarians should figure out some way of keeping the indexes up-to-date. Discussions have been held on these subjects many times and in many places, but we are still in need of better indexing tools. Medical librarians should take concerted action to offer help in the indexing of medical literature. We have a partial solution in Rochester for this problem for our own physicians and certainly other librarians offer a similar service. Our library receives about 1,800 medical journals currently. Approximately 800 of these are in the English language. One of the assistant librarians examines journals printed in English and prepares bibliography slips on special subjects for the members of our staff as they request this service. Several years ago we were able to examine all of our journals for this purpose, both English and foreign, but we find that this would be an impossible task today. Moreover, our physicians seem to be satisfied with the service of currently screening about 800 English language journals in their subjects.

COMPILATION OF BIBLIOGRAPHIES

What can we do as librarians in other ways to promote the reference function? One obvious way is the compilation of bibiliographies relating to our fields. For instance, it has long seemed to me that there was a need for a bibliography of medical works that have been reproduced in facsimile. Most of these works are almost impossible to obtain in original editions and many of the facsimiles are scarce. But enough of the facsimiles are available so that the average medical library may have some of them for a small financial outlay. For all practical purposes, it would seem that facsimiles are as useful as original editions. That is, they may be used as source materials by the physician who wishes to refer to original contributions. They are attractive items for historical exhibits. For the profound scholar, also, they would seem to be indispensable. Because the usefulness of such a bibliography seems to me so evident, I am working on one. A compilation of this sort will not be helpful until it is published and made available to medical libraries.

COMPILATION OF SPECIAL LISTS

Most libraries have special collections that are practically unknown outside of their own libraries. These holdings should be listed and described and the descriptive lists should be distributed to medical libraries. It is not enough to have books on special subjects for they are of little use unless their whereabouts are made known to other libraries and to the scholars and physicians in their respective communities.

TRANSLATIONS

Busy American physicians of today are handicapped because of their lack of knowledge of foreign languages. While it is true that English is now the language in which many of the most important scientific contributions are made, yet some excellent contributions are being made daily in other languages, and for past solutions of fundamental problems—the classics of medicine—one should consult original sources. Many of these sources are in Latin, Greek, German, French, Italian, Spanish and other languages.

The active librarian must make some provision for help in foreign language problems. At the Mayo Clinic articles in foreign languages are translated for staff members at their request. Most of the translations are made by fellowship physicians from foreign countries who have native ability in the languages that they are asked to translate.

(Continued on page 589)

MEDICAL
SCIENCES
REVIEWS

In the interests of continuing medical education, The Journal-Lancet *offers this department of authoritative reviews of important progress in scientific medicine, both in the fundamental and the clinical fields. The editors propose to define medical sciences very broadly, and hope that each subject treated will be of sufficient importance to interest every reader.*

Brain Mechanisms and Behavior with Special Reference to the Rhinencephalon*

The 1951 *Journal-Lancet Lecture*

HEINRICH KLÜVER, Ph.D.
Chicago, Illinois

It should be emphasized, first of all, that it is possible to analyze and study behavior for its own sake and even predict the directions and turns of behavior on the basis of such an analysis without bothering to consider whether the skull contains a brain or a vacuum, whether it contains a hemi-decorticated brain or merely Wiener's cybernetic conception of a brain. I am not, however, concerned here with such an approach: I am concerned with various attempts to relate certain forms of behavior to certain brain mechanisms.

At the start, I shall return for a moment to the heroic age of cerebral physiology, that is, to the age of Hitzig, Goltz, Munk, David Ferrier, and E. A. Schäfer. If we go back about eighty years we find that one of the first systematic explorations of the brain, more specifically, the electrical stimulation of the motor cortex of dogs, was started in the bedroom of Mrs. Hitzig. Since Hitzig found no facilities for operating on his dogs in the physiological institute of the largest university of his country, he performed his operations on a table in the bedroom of his wife. Mrs. Hitzig personally took care of the operated dogs in a room adjoining the bedroom. It seems, indeed, a far cry from the bedroom of Mrs. Hitzig to international congresses dealing with psychosurgery or electroencephalography and to conferences on cybernetics concerned with the question of whether the brain is an analogical or a digital device. It is rather unfortunate that many of the valuable observations made by the early investigators of the brain have in the meantime been entirely forgotten. In reading the papers published during the early days of cerebral physiology, you will gain the impression that scientists, judging by the bitterness of their controversies, used to be entirely absorbed in their scientific problems rather than in multifarious non-scientific activities.

If we first take a broad view of the ideas that have prevailed in relating brain and behavior and if we consider only the more complex behavioral functions instead of the problems involved in a "localization" of sensory and motor factors, we find that investigators at one time or another during the last 70 to 80 years have assigned the chief role in mediating higher psychological functions to the frontal lobe or to the parietal lobe or to the temporal lobe. It seems that the only part of the brain which has consistently escaped such a role is the occipital lobe since no one has ever seriously advanced the view that this lobe is of fundamental importance for the structure of human personality. One may inquire, therefore, why there should be this exceptional "purity" of the occipital lobe.

Perhaps some light can be thrown on this question by considering the results I obtained in my experimental work on the functions of the occipital lobe.[83] These results indicate that the occipital lobe, or more specifically the geniculostriate system, enables the organism to fall back on mechanisms which guarantee an approximate constancy of the external environment. There is not only a homeostasis of the *milieu interne*, but also a homeostasis with respect

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*The Division of the Biological Sciences, University of Chicago, Chicago, Illinois. Aided by the Dr. Wallace C. and Clara A. Abbott Memorial Fund of the University of Chicago.

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to the external environment, the *milieu externe*. It is, briefly stated, the chief function of the occipital lobe to achieve such a homeostasis with reference to the external environment. In microsmatic "optoid" animals, such as the primates, the external world, structured as it is in terms of objects with fairly constant properties, is built up chiefly via the visual route.

If we consider the relations of higher psychological functions to the frontal, parietal, and temporal lobes, it is obvious that the growth of psychosurgery during recent decades has focussed attention almost entirely on the frontal lobes. It seems pertinent to recall that one of the great physical anthropologists, the late Weidenreich, in studying the phylogenetic transformation of the human skull and comparing anthropoid apes, hominids, and recent man, reached the conclusion ("from which there is no escape") that the greatest degree of differential enlargement during the last evolutionary stage has occurred not in the frontal, but in the posterior parietal and inferior temporal regions.[155,156] If there has actually been, as von Monakow asserted, a migration of functions towards the frontal pole it becomes obviously necessary to define the nature of the functions supposedly involved in such a migration. In the meantime it has become increasingly evident that the effects of frontal lobotomy cannot be understood without going beyond the frontal lobes. According to A. Meyer and McLardy, "frontal lobe function cannot be dealt with in isolation" since the direct and indirect connections of the frontal lobes, including the connections with regions "previously considered to be concerned with smell," are of prime importance in determining the effects of the surgical procedures.[44] Nielsen[107] has insisted that the frontal lobes are profoundly concerned with emotions only "by virtue of the cingular gyrus-orbital cortex connections and the orbital cortex-temporal lobe connections." Fulton[52] appears to have chosen the title of his recent book, *Frontal Lobotomy and Affective Behavior*, for historical reasons only, since the book itself dwells at length on the importance of rhinencephalic structures for emotional behavior. Its main thesis, in fact, may be considered an elaboration of some of Kleist's[78,79] ideas on the anatomical substratum of emotions: its very frontispiece illustrates the connections of the so-called "visceral brain" or rhinencephalon and emphasizes the fact that the frontal region is merely one of many regions related to the rhinencephalon. It appears, therefore, that in modern discussions the frontal lobe has increasingly become merely a point of departure for talking about regions outside the frontal lobe, that is, regions which must be considered of fundamental importance in understanding the effects of psychosurgery with reference to complex behavior alterations and personality changes. The fact that the rhinencephalon and its connections play an outstanding, if not the central, role among these regions became evident after my first experiments on monkeys in 1937, carried out in collaboration with Dr. Paul C. Bucy. In these experiments the behavior alterations following lesions involving rhinencephalic structures were studied in great detail. The rhinencephalon (hippocampus, uncus, and amygdala) was extensively removed on both sides in addition to most of the temporal neocortex (Brodmann's areas 22, 21, and 20 and including, therefore, von Bonin's and Bailey's[23] area TG). Since the behavior alterations following such extirpations represent undoubtedly the most striking behavior changes ever produced by a brain operation they should be considered in some detail. I shall, therefore, indicate the outstanding symptoms observed in these bilateral temporal monkeys, more particularly, the symptoms found in sexually mature macaques.[84,89]

First of all, certain forms of behavior generally observed after the operation seem to indicate a *visual agnosia;* that is, the ability to detect and recognize the character or meaning of objects, on the basis of visual criteria alone, appears to be lost although there are no or at least no gross defects in the ability to discriminate visually. When confronted with various edible and inedible objects, the caged-in monkey, even when hungry, picks up all objects indiscriminately and, after an oral examination, discards each inedible object and consumes the edible ones. But immediately afterwards, it may again and again re-examine such discarded inedible objects as a piece of sealing wax, a test tube, a wad of cotton, a metal ring, a screwdriver, a piece of feces, or a nail. In fact, if given an opportunity, it tends to examine a live snake or mouse, the finger tips, eyebrows, and shoes of the experimenter, a spot of moisture on a table, a speck of dirt on a mirror, a figure or line drawn on paper with the same eagerness and care as a piece of food. Such an animal displays a strong tendency to approach every animate or inanimate object without hesitation, including objects which preoperatively called forth strong emotional reactions, as evidenced by vocalization, avoidance reactions, flight, and other forms of response. It may pick up and examine hundreds of edible and inedible objects presented one after another, at equal or unequal time intervals, within reach of the cage ("endless belt" experiments) while it may contact or examine, if free in a large room, more than 100 objects in half an hour and, even when hungry, may pass pieces of food on the floor many times before picking them up. In brief, the animal generally behaves as if visual inspection alone were no longer sufficient for detecting the meaning of objects. It deserves mention that this picture of an agnosia or, to use Munk's expression, "psychic blindness" does not seem to be confined to the visual field since close observation indicates similar "agnostic" symptoms in the auditory and tactile fields. There is a strong tendency to examine all objects by mouth. The object is touched with the lips, put into the mouth, chewed, licked, gently bitten, and "smelled" by holding it before the nostrils. There are also strong *oral tend-*

encies in that the animal tends, if given an opportunity, to contact all objects or parts of them directly by mouth instead of first picking them up. Even the cutting of the olfactory tracts previous to removing the rhinencephalic structures and the temporal neocortex does not eliminate any of the oral tendencies except the "smelling." The tendency to contact objects orally can be easily aroused even in monkeys in a sleep-like state during the first few days after the operation. Furthermore, the bilateral temporal monkey displays an excessive tendency to take notice of and attend to every visual stimulus. The animal is, to use a modern expression, "stimulus-bound." Moreover, it frequently behaves as if forced, under the influence of some "compulsory" or "irresistible" impulse, to contact every object in sight. The presentation of any visual object will, whenever possible, lead immediately to the requisite motor response for contacting it as quickly as possible. There is, to express it in Wernicke's terminology, a *hypermetamorphosis* and at the same time a *hypermetamorphic impulse to action.*

The profound *changes in emotional behavior* in previously "wild" and aggressive monkeys are impressive. Emotional reactions may be completely absent in the sense that motor, vocal, and other forms of behavior generally associated with anger and fear reactions in macaques are not exhibited. The monkey approaches and contacts every kind of object without hesitation, whether it be a strange person, a cat, a dog, a snake, an inanimate object, or another monkey that has just bitten it. Furthermore, all "expressions" of emotions, such as vocal behavior, facial expressions, and "chattering," may be entirely lost. In connection with these changes in emotional behavior the equally remarkable *changes in sexual behavior,* particularly the hypersexed behavior observed in males, must be mentioned. A striking increase in both sexual activity and the diversity of sexual manifestations becomes evident about three to six weeks after the operation, involving forms of heterosexual, homosexual, and autosexual behavior rarely or never seen in normal monkeys. In fact, an intensification of sexual responses may occur even in a pseudohermaphrodite or in a female from which the uterus and both ovaries have been removed prior to extirpating the temporal lobes. All of the more active among the operated monkeys tend to perform peculiar movements, "antics," and gesticulations while sitting, lying, jumping, swinging, or hanging from the top or sides of the cage, thus displaying a kind of witzelsucht of the extremities. There is little doubt that some of the movement patterns or manipulations, such as the prolonged biting or sucking of the fingers, toes, feet, legs, tail, and other parts of the body, are by-products of heightened sexual activity or at least involve a sexual component. Finally, there is a striking *change in dietary habits* in the sense that the operated rhesus monkeys consume large quantities of ham, bacon, ground beef, broiled lamb chops, smoked whitefish, and other kinds of meat. Some of these animals regurgitate incompletely digested food and "chew the cud"— thus displaying "ruminating tendencies" not generally present in normal rhesus monkeys. In many instances appetite and food consumption may increase.

In considering the total picture of behavior alterations following removal of both temporal lobes, including most of the rhinencephalic structures, it becomes evident that these behavioral changes are so striking and complex and affect the relation between animal and environment so deeply that all changes observed in monkeys after bilateral prefrontal, parietal, or occipital lesions pale into insignificance. It is of interest that we published our first case[86] and showed a film illustrating the behavior of such a bilateral temporal monkey before the American Physiological Society a few months before the appearance of the now famous theoretical paper by Papez[113] on "a proposed mechanism of emotion." In this paper which is being hailed[52] as becoming "something of a classic in the history of neurology," Papez analyzed anatomical, clinical, and experimental data of various kinds and offered the proposition that "the hypothalamus, the anterior thalamic nuclei, the gyrus cinguli, the hippocampus and their interconnections" constitute a mechanism elaborating "the functions of central emotion" and participating in "emotional expression." It is obvious that the Papez cortical circuit for emotions (hippocampus → fornix → mammillary body → anterior thalamic nuclei → cingular gyrus → cingulum → hippocampus) has been definitely interrupted in our experiments and that the behavior manifestations just described represent, therefore, facts which must be taken into consideration in evaluating the Papez theory.

Unfortunately, it would be too time-consuming to consider these behavior manifestations in relation to the structures destroyed or damaged in our extirpations or in relation to subsequently degenerated fiber tracts and nuclear structures. I shall merely mention that microscopic examination of the brains of our bilateral temporal monkeys has shown degeneration in the fornix (the degenerated fibers ending in the septal area or in the mammillary nuclei), anterior commissure, stria terminalis, uncinate fasciculus, temporopulvinar or Arnold's bundle, fibers passing to the posterior cingulum and through the posterior part of the corpus callosum, temporo-olfactory, corticotectal, and corticonigral tracts. As a result of differences in the extent of the lesions, there are differences, for instance, in the extent of damage to the visual and auditory systems. While retrograde degeneration in the lateral geniculate bodies is sometimes absent, the interruption of ventral fibers of the visual radiation has in general led to small areas of degeneration in the ventrolateral horns of the lateral geniculate bodies. As regards the auditory system, retrograde cellular degeneration is generally present only in the posterior tips of the medial geniculate bodies. There is no degeneration in the nuclei of the thalamus except in small parts of the inferior, medial, and lateral nuclei of the pulvinar. An analysis of both the anatomical and the behavioral data strongly suggests that the symptomatology of the bilateral temporal monkey is not the result of an impairment of "simple" sensory functions or of a combination of various sensory deficits.

In analyzing the role of the nervous system in behavior, the relationships between the cerebral cortex and the hypothalamus on the one hand and between the hypothalamus and the endocrine glands on the other hand have become increasingly important.[37,64,72,154,157] There have been definite advances in our knowledge of cortical systems affecting autonomic function. Of particular interest in this connection are the results on autonomic responses obtained by ablating or electrically stimulating parts of the rhinencephalon or regions connected with rhinencephalic structures.[13,41,67,68,70,75,76,116,130,139,151] In the light of anatomical, neurophysiological, and biochemical data at present available, the question becomes pertinent[84] whether some of the behavior alterations found in bilateral temporal monkeys can be properly understood only in terms of hypothalamico-hypophyseal mechanisms. I have in mind such symptoms as the hypersexed behavior, the eating of meat by previously frugivorous animals, and even the loss of maternal behavior in some monkeys. For the proper evaluation of the significance of the anatomical changes in the brains of our animals, it should be emphasized that these changes, complex as they are, have been ascertained by studying serial sections stained by Nissl and Weil methods. There is little doubt that the picture of anatomical changes turns out to be even more complex when using additional techniques for histological analysis. Dr. W. R. Adey (personal communication), by the use of the Glees silver technique, found, for example, that destruction of the posterior, basal, and medial parts of the amygdala on one side in the monkey leads, among other things, to terminal degeneration in the dorsomedial and ventromedial nucleus of the hypothalamus on both sides.

One of the cases in our series appears to be of special medical interest. In this particular case, bilateral temporal lobectomy in an adult female rhesus monkey was preceded by removal of both prefrontal lobes. The restlessness and hypermotility characteristic of prefrontal monkeys completely disappeared after removing the left temporal lobe, and symptoms essentially similar to those previously described as characteristic of bilateral temporal monkeys appeared upon extirpating the right temporal lobe. When this animal died six years and nine months after the last brain operation, postmortem microscopic study revealed an extensive spontaneous endometriosis. Dr. Barthelmez and I[85] have pointed out that various conditions developing in this monkey after the temporal lobectomies (polydipsia, bulimia with progressive adiposity, hyperplasia of the rete ovarii) may be ascribed to an endocrine imbalance related to degeneration of fibers and injuries to the hypothalamus and we have offered the further suggestion that the endometriosis also resulted from the endocrine dyscrasia. At any rate, the data at hand are sufficient to warrant the statement that a more complete understanding of the diverse behavior alterations following removal of the temporal lobes, including major portions of the rhinencephalon, can be achieved only if the psychological, neuroanatomical, and neurophysiological analysis of the effects is supplemented by biochemical lines of investigation. On the basis of these considerations I am inclined to agree, therefore, with Stanley Cobb who in his book on *Emotions and Clinical Medicine*[39] insists that one of the most important questions "for the understanding of how the brain works at both primitive and sophisticated levels" is the question of the relationship of the hypothalamus to the rhinencephalon. This question—"a fundamental question for physiology and psychology"—is the main concern of Cobb's book, that is, of a book which is primarily concerned with problems of psychosomatic medicine. Pending, however, a more detailed analysis of the physiological and biochemical factors involved in the relations between rhinencephalon and hypothalamus, a clearer understanding is necessary of the various forms of behavior and behavior alterations related to these factors.

A thorough study of the behavior mechanisms underlying the reactions of the bilateral temporal monkey to environmental objects and events undoubtedly requires, or should include, animals which have been trained pre- or postoperatively to respond differentially to various kinds of stimuli. In establishing conditioned reactions, I have used techniques and testing devices which I previously developed for work with sub-human primates (pulling-in techniques,[80] auto-multi-stimulation reaction board,[81] form board,[82] etc.). For instance, I have trained animals to respond differentially to visual, auditory, vibratory, and weight stimuli. It may be briefly stated that most of the differential responses were lost or seriously disturbed after the bilateral temporal lobectomy, but that they could be re-established by training although the postoperative retraining usually required more trials than the original training. Once a conditioned response was reacquired, it was not easily lost. For example, a differential response to auditory stimuli was still intact in retention tests given after five years. Furthermore, the experiments provided evidence for an equivalence of stimuli in the sense that the particular stimuli used in eliciting a given differential response could be replaced by others without disturbing the consistency of the reaction. In bilateral temporal monkeys trained, let us say, to respond positively to a circle instead of a square, the consistency of the differential response was not disturbed by marked variations in brightness, color, size, and shape. Such a monkey would, for instance, immediately respond to almost any curvilinear figure or object, such as the outline of a face instead of an irregular hexagonal figure or a cylinder instead of a cube. Finally, the operated monkeys could be trained on new problems and acquired conditioned differential reactions to new stimuli not only during the first several months, but even seven years after the operations. There are no reasons, therefore, to assume that "general deterioration" is one of the chief results of a temporal lobectomy.

The experimental work on conditioned responses raises, however, a number of questions which cannot be answered without further behavioral investigations. We find, for instance, that a bilateral temporal monkey, which, as indicated by various reactions, is able to see black figures on a black ground and other difficultly discriminable stimuli as well as or better than the experimenter, may not be able to perform the preoperatively learned response of pushing aside or picking up a conspicuous, white, circular object instead of an angular one lying on a black ground. To say that such a monkey has lost a "visual" discrimination habit is utterly misleading. The more likely interpretation is that a derangement or change in non-visual factors is being exhibited here by way of reactions to visual stimuli. It will be the task of future research to specify the various non-visual factors more definitely.

Difficulties in interpretation also arise if we study the ability of bilateral temporal monkeys to solve problems generally considered to require the highest level of "intelligence" in animals, namely, the ability to use "tools."[80] I should like to emphasize that the more complex forms of implement-using behavior have only been demonstrated in chimpanzees and in some of the South American monkeys, such as cebus monkeys. The two operated cebus monkeys included in our series differed strikingly in their postoperative performances. In one case, the ability to use objects as tools was entirely lost and even long-continued attempts to train the animal in the simplest forms of instrumentation, such as the use of a stick to obtain food beyond reach, failed during a period of four years after the temporal lobectomy. In the other case, even problems requiring the successive use of two objects were solved as early as two weeks after the operations and more complex problems continued to be solved during the next six and a half years. It should be added that a baboon solved problems requiring the use of two objects four weeks after removal of the temporal lobes and continued solving similar problems during the next four years. From an examination of the brains of these animals it appears unlikely that the differences in postoperative implement-using behavior were related to differences in the extent of the lesions. It seems more likely—it is at least one of the possibilities that should be explored—that these differences were related to the level and nature of the preoperative performances. While it is true that all normal cebus monkeys are able to employ objects as tools, the fact remains that an animal required to solve different problems of ever increasing complexity will handle and manipulate a variety of objects and cannot help learning about their particular properties, such as their being "movable," "breakable," etc. It should be stressed, therefore, that only the baboon and one of the cebus monkeys had been used in extensive investigations of implement-using behavior before the operations (for periods of six and nine months, respectively). On the other hand, the cebus monkey which lost, and could not reacquire, its implement-using abilities postoperatively had been submitted to only a few implement-using tests prior to the operation. The instrumental use of objects by bilateral temporal monkeys raises the puzzling question as to why monkeys which behave "as if" they cannot distinguish edible and inedible, dangerous and harmless objects can solve problems which supposedly require the highest form of animal "intelligence."

In this connection it seems also pertinent to inquire whether surgical removal of the temporal lobes in healthy monkeys produces the same or similar symptoms as a destruction by pathological processes. This gives me the opportunity to mention the most "intelligent" animal I ever examined. This male cebus monkey equalled, if not excelled, chimpanzees in the instrumental use of objects. During the last year of his life he solved many problems requiring the successive use of four or five objects as tools. For instance, tethered to one side of a room, he obtained food by (1) locating a large metal ring lying in a box on the wall out of sight which he reached by climbing, (2) using the ring to obtain a stick lying out of reach on the floor, (3) using this stick to knock down a longer stick hanging beyond reach on one of the walls, and (4) using the longer stick for knocking down food suspended beyond reach from the ceiling. Examination of the brain of this animal revealed an extensive destruction of the temporal lobe, including damage to the rhinencephalon, on both sides. The extent of the lesions on the left side is shown in figure 1. Microscopically, the widespread pathological process was in Dr. Bailey's opinion an infectious (tuberculous?) granuloma. While there are definite differences between the bilateral lesions found in this monkey and those found in the operated monkeys, it seems remarkable that none of the previously described "temporal lobe" symptoms seen in cebus monkeys or macaques were ever observed in this animal. It is equally remarkable that this monkey, even four weeks before his death, was able to solve problems, such as obtaining food beyond reach by pushing a box to a point beneath the suspended food and then knocking it down with a stick.

For a better understanding of the behavior alterations following bilateral temporal lobectomy it becomes important to obtain more detailed information on the changes in symptomatology occurring with the passage of time. Unfortunately, in many neurological and physiological studies, if concerned

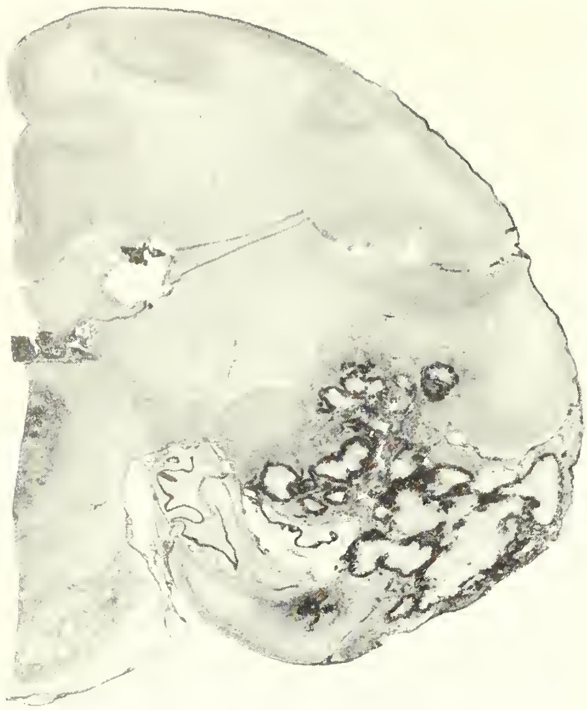

Fig. 1. Coronal section through left hemisphere of cebus monkey.

with behavioral aspects at all, sweeping conclusions have been drawn on the basis of observations extending over only several weeks or months. A one-sided or an entirely inaccurate picture must result when dealing with animals with a life span of twenty years or longer. My observations on bilateral temporal rhesus monkeys indicate that the first symptoms to disappear after the operation are the eating of meat and the hypersexed behavior. In only one case (with both prefrontal and temporal lobes removed) was meat still consumed two years after the operations. The next symptoms to disappear seem to be the "agnostic" disturbances or the picture of a "psychic blindness." The hungry animal will pick up edible objects first although it continues to exhibit the tendency to examine subsequently most of the inedible objects. The oral tendencies, the "hypermetamorphosis" and "hypermetamorphic impulse to action," and certain emotional changes are still present, or at least appear to be present in a modified form, eight to ten years after the brain operations. In connection with the changes in sexual behavior, it is of interest that in one of the male rhesus monkeys, in which the hypersexed behavior was still very prominent a year after the lobectomies, Dr. Fred Koch detected no urinary estrogens, but found a value of 1.6 (mg./24 hrs.) in studying 17-ketosteroid excretion. Eight years later, when this monkey exhibited an intense reddening of the "sexual skin," including the scrotal skin, and no signs of sexual activity, Dr. P. L. Munson obtained a value of 1.64 for 17-ketosteroids and of 7.7 I.U. per day for estrogens. The values reported in the literature for urinary estrogens in adult female rhesus monkeys range from 7 to 12 I.U. per day. Far more extensive studies are needed for analyzing the sequence of behavioral, physiological, and biochemical alterations occurring with the passage of years. No doubt, a more detailed knowledge of the residual symptoms will throw light on the mechanism underlying the diverse behavior manifestations present immediately after the operations.

Since the publication of my and Dr. Bucy's experiments[27,86–89] in 1937-40 and of Papez' theory[113] on the anatomical substratum of emotions in 1937, a large number of anatomical, neurophysiological, and behavioral studies have appeared which broaden the base for a more thorough understanding of the functional significance of the relationships between neocortex, rhinencephalon, and hypothalamus. Numerous anatomical studies have provided information on the various structures and tracts removed or damaged in our operations or eliminated by retrograde degeneration. New anatomical data have become available not only for the monkey, but also for other mammals, such as the rat, rabbit, cat, dog, and man. Many of these studies have been concerned with the rhinencephalon and its connections or with regions which are, or which are alleged to be, functionally or anatomically related to the rhinencephalon. These investigations have thrown new light on structures and fiber tracts, such as the hippocampus and pyriform area,[2,3,8,9,24,134] fornix,[8,46,144] mammillary body,[8,45] anterior thalamic nuclei,[126] cingular gyrus and cingulum,[2,3,55,126] amygdala,[25,47,101] stria terminalis,[46] olfactory bulb and tract,[35,36,38,105] anterior commissure,[26,48,50] pulvinar,[29,133] and the connections of various regions related to rhinencephalic structures.[34,104] In general, the anatomical evidence from these investigations tends to support the original thesis of Papez that the structures involved in his cortical circuit have little or nothing to do with olfactory functions. If, then, many of the components of the so-called olfactory brain of higher mammals are not concerned with olfaction, the term rhinencephalon should obviously no longer be used in relation to certain structures and connections. Interestingly enough, ten years before the publication of the Papez theory, Maximilian Rose, in his studies of the allocortex,[128,129] considered on purely morphological grounds the possibility that the hippocampus has functions other than olfactory or subserves nonolfactory functions only. Furthermore, all available embryological findings, as pointed out by Macchi in a recent study,[97] suggest that in man and other microsmatic animals ". . . the olfactory centers have been modified by the reduced importance of smell and the tremendous development of psychosomatic nonolfactory activities."

During the last decade or so workers in many centers have given even more attention to electrophysiological than to anatomical investigations. The data obtained have been derived from evoked potential studies, strychninization studies, and determinations of the somato-motor, autonomic, and electrocorticographic responses to electrical stimulation in man, chimpanzee, monkey, dog, cat, and rabbit. The cingular gyrus seems to have been of central interest in many of these investigations.[33,42,53,93,94,120–122,124,127,135,138,139,152,160] Other electrophysiological studies have thrown light on the activity, functions, or connections of the hippocampus and pyriform area,[49,93,122–124,137,139] uncus,[65,95,96,137] mammillary body,[127,160] anterior thalamic nuclei,[17,127] amygdala,[49,93] olfactory bulb and tract,[4,5,49,125] anterior commissure,[15,56,103,149] corticotectal tracts,[117] orbital brain,[28,53,65,93,122] temporal pole and other temporal regions.[28,53,93,145,150] The wide attention that has come to be focussed on researches of this kind is apparent from such facts as that Kaada's report[75] on electrophysiological studies of responses from rhinencephalic and related structures covers almost 300 pages. There is no doubt that many of the results obtained by employing the methods of physiological neuronography will have to be related to or be confirmed by anatomical findings. As regards the significance of these developments for the study of behavior, stimulation experiments such as those performed by Hess and collaborators on freely moving unanesthetized animals[67–69,71,132,149] prove to be more illuminating than most of the electrophysiological researches just referred to. Even here the results are often difficult to interpret as was fully recognized by Sigrist.[132] This investigator found, when using Hess' technique, that stimulation of the mammillothalamic tract in cats often leads to flight reactions. The occurrence or non-occurrence of a flight reaction, however, is determined and influenced by numerous factors in the internal and external environment. It makes a difference, for instance, whether the cat is sleepy, is taking care of its litter, is in the presence of a dog or of strangers, notices that a door is ajar or a window open, etc. As long as an animal responds to its environment at all, the behavioral effects produced by electrical stimulation are bound to be multivalent. Furthermore, numerous and heterogeneous stimuli are equivalent or non-equivalent in producing a given response, such as a flight reaction, and it is obvious that the nature of the behaviorally effective stimulus properties or conditions can be inferred only from experimental studies of behavior. Unless electrophysiological studies are supplemented by a behavior analysis, the behavioral effects of electrical stimulation, even in unanesthetized animals, cannot be readily interpreted. In appraising the recent additions to our knowledge in the electrophysiological field, I am inclined to agree with Golla[44] "that a time will come when these new facts will be coordinated with psychological functions . . . " But this time may very well be in the distant future unless electrophysiologists shift their point of attack or become more successful in relating their facts to mechanisms actually operative in behavior.

Some recent behavioral studies throw light, or were designed to throw light, on the behavior disturbances observed in our bilateral temporal monkeys. The lesions were usually not as extensive as ours and generally involved one or several rhinencephalic structures in addition to different neocortical regions. In some instances the ablations were confined to neocortical areas (as in our control experiments). A great deal of this work recently published here and abroad was done on monkeys.[1,21,22,30–32,43,52–54,60,91,92,118,136,140,146,147,152] Data have also become available on dogs,[6,7,141,142] cats,[19,131,157] and man.[111,112,143,153,158,159] One of the questions raised by our behavior analysis of bilateral temporal monkeys is whether the symptoms are more or less interdependent or merely appear in a syndrome the components of which can be independently produced by specific lesions. In considering the recently published experimental work on monkeys, assertions such as that the total picture of behavior alterations can be definitely broken down into "neocortical" and "rhinencephalic" components or even smaller components must be viewed with some misgivings at present. It remains to be seen whether the loss of a learned differential reaction to "visual" stimuli in a "stimulus-bound," hypersexed monkey without fear or anger reactions is really the "same" as that occurring in a monkey without such symptoms and with a more restricted or differently situated lesion. It remains to be seen whether the loss of fear reactions in a monkey with compulsory oral behavior and a "hypermetamorphic impulse to action" is the "same" as that found in a monkey not exhibiting such forms of behavior. The answer to such questions can be provided only by a more thorough behavior analysis the difficulties of which should not be underestimated. It is unfortunate that behavior has often not been as intensively studied as necessary for drawing definite conclusions or that the conditions under which the behavior data were obtained have not been clearly specified. For instance, the widely quoted statement (for which Ward[152,153] is apparently responsible) that resection of the rostral cingular gyrus leads to loss of "social conscience" in monkeys is well-nigh meaningless as long as the experimental details on which such a statement supposedly rests have not been disclosed. Furthermore, some investigators who have supplied detailed anatomical data have at the same time furnished only scant behavior data while others presenting more detailed results along behavioral lines have restricted their anatomical investigations to studying retrograde degeneration in the thalamus only. There is no doubt that age, sex, species, and many other factors influence the picture of behavior alterations produced by a bilateral temporal lobectomy. In some studies, differences in symptomatology have been attributed to differences in the extent of the lesions while the age factor has not been taken into consideration. The syndrome following the operations is different even in different species of monkeys. It is perhaps not surprising, therefore, that even more striking differences in symptomatology appear when animals other than primates, such as carnivores, are studied. Nevertheless, there is no escaping the fact that statements about differences between different species are worth just as much or little as the basis on which they rest, that is, the basis provided by our knowledge of the mechanisms operative in the behavior of the particular species.

The behavioral effects of temporal lobe lesions in monkeys assume particular significance when considered in relation to the results recently obtained by Bailey and others in the surgical treatment of psychomotor epilepsy. A therapeutic effect is commonly obtained on both the psychiatric and epileptic manifestations when patients, in whom the electroencephalogram discloses spike seizure activity in the anterior temporal region, are subjected to temporal lobotomy or lobectomy.[14,16,57–59,62,73,74,99,100,114,115,119] The fact that the surgical therapy of epilepsy recently led to operations on the temporal lobe is of interest because symptoms produced by mescaline resembling those of the "uncinate" form of epilepsy originally aroused our interest in the rhinencephalon and led to our first temporal lobe operations in monkeys.[89] Surgical treatment of psychomotor epilepsy may produce symptoms similar to those seen in monkeys if the operations involve both temporal lobes. For instance Green and his coworkers[62] report that a bilateral anterior temporal lobectomy in one of their patients produced increased sexual interest, profound changes in emotional behavior, and a "hypermetamorphic impulse to action."

Since the "psychiatric" manifestations of temporal lobe lesions[51,78] have always interested students of abnormal behavior, it is readily understood why not only the total picture of behavior alterations as seen in our monkeys, but even single symptoms have been analyzed or discussed in relation to psychiatrically significant problems.[11,12] Some of the psychiatric disorders accompanying temporal lesions in man are gradually being recognized as referable in part at least to rhinencephalic structures. It is regrettable that many of the cases with tumors, malformations, or destructive lesions of the rhinencephalon have not been, or could not be, psychologically studied.[18,40,61,63,77,102,106,108–110,148]

Despite the paucity of experimental data, there has never been a lack of speculations concerning the functional significance of the rhinencephalon or, more particularly, of the hippocampus. In retrospect, the similarity of the neurological hypotheses proposed by workers in different fields is rather striking. About twenty years ago, Herrick,[66] on the basis of comparative anatomical considerations, advanced the view that the rhinencephalon may serve as a non-specific activator for all cortical activities and that it may act on "the internal apparatus of general bodily attitude, disposition and affective tone." Only a few years ago, Grünthal,[63] after studying a patient with bilateral hippocampal lesions, reached the conclusion that the hippocampus represents a "catalytic activator" which, although not participating in specialized functions itself, is nevertheless basic for the proper functioning of affective and neocortical activities. Again, almost twenty years ago, Kleist[78] advanced the hypothesis that the rhinencephalon (or the "inner brain," to use his expression) is not only basic for emotional behavior, attitudes and drives, but also instrumental in correlating "visceral receptions" from the oral, anal, and genital regions and the intestines thus subserving functions related to the search for food and sexual objects. And only recently, MacLean,[98] in expounding and elaborating the Papez theory of emotions, suggested that the rhinencephalon (or the "visceral brain," to use his expression) is of basic importance not only for emotional behavior, but also for correlating "oral (smell, taste, mouth) and visceral sensations" as well as "impressions from the sex organs, body wall, eye and ear." Our own work may be said to have given partial support to these various theories, but there is little doubt that further progress depends less on building up more elaborate theories than on analysis and ever more analysis along behavioral, physiological, and biochemical lines. Elliot Smith once insisted that a complete understanding of the morphological and phylogenetic aspects of the hippocampal region is the key to an understanding of the morphogenesis of the whole cerebral cortex, and Altschul[10] considered that the uncus is an "index" of the complexity of the organization of the whole brain. Judging by the various theories just referred to it looks as if the hippocampal region or, at any rate, the rhinencephalon has now become even the key to the whole field of psychology. You have probably noticed that I have chosen to stay on the descriptive level in reporting our experimental work and that I merely tried to present a contribution to what I once called the field of "morphopsychology."[80] The fact that I did not mention many of the general problems involved in a cortical "localization" of functions seems to be particularly appropriate at a time when the "laminar" physiology of the cortex is almost entirely ignored and when neurohistologists again raise the cry that "neuron theory and anatomical reality" are far apart.[20]

A psychoanalyst, Lawrence S. Kubie,[90] recently noted that "not one of the psychiatric discoveries of the past 50 years was made in this country." Such a situation may well be remedied by more intensive behavioral, physiological, and biochemical analysis of relationships between rhinencephalon, neocortex, hypothalamus, and endocrines. Implications of the facts and considerations presented here seem so challenging for the field of psychiatry that I should like to express hope that nothing will deter even psychoanalysis from participating in the venture of making a great "psychiatric discovery" in the next 50 years.

The references cited in this article will be included in the author's reprints.

Lancet CLINICAL REVIEWS

This department of The Journal-Lancet *is devoted to reports on cases in which all the appropriate diagnostic criteria have been employed, the best known treatment administered and the results recorded. It is desired that these case reports be so prepared that they may be read with profit by physicians in general practice, hospital residents and interns and may be of considerable value to junior and senior students of medicine. This department welcomes such reports from individuals or groups of physicians who have suitable cases which they desire to present.*

Hemoglobinuric Nephrosis*

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Mrs. D. Z., age 36, No. 833998, was admitted to the University Hospitals on July 18, 1951. She had always been well except for irregular menses, but since her last menstrual period, about one month prior to admission, there had been continuous vaginal bleeding. The third of her five children was slightly jaundiced at birth, but this disappeared within two weeks. She was hospitalized elsewhere with the diagnosis of uterine fibromyomata. On July 13 a blood transfusion was followed by chills, fever, nausea and vomiting; an infusion of 5 per cent dextrose in distilled water was started. On July 16 a second transfusion was followed by nausea and vomiting but not by chills nor fever. By July 17 the urinary output had fallen to a few cubic centimeters in 24 hours. At no time was she jaundiced.

Physical examination, on admission in July, revealed an afebrile, well developed, well nourished, alert, cooperative, pale female who weighed 59.3 kilograms and exhibited no sign of acute distress. Blood pressure was 120/60, pulse 80 and respirations 18. The sclera and mucous membranes were pale. There was no evidence of jaundice. Other pertinent findings were: a soft systolic apical murmur, an irregularly enlarged uterus with multiple myomata; and bleeding from an hypertrophied cervix. No urine was obtained by catheterization.

The hemoglobin was 8.5 grams and leukocyte count 12,500, with 87 per cent neutrophiles, 6 per cent lymphocytes, 6 per cent monocytes and 1 per cent basophiles. The hematocrit was 25.5 per cent. The bleeding time was 3 minutes 30 seconds and the clotting time was 2 minutes. The prothrombin time was 13.8 seconds with a control of 12.7 seconds. The urea nitrogen of the blood was 110 milligrams per cent, the creatinine 12 milligrams per cent, the carbon dioxide combining power of the plasma was 19 milliequivalents, the serum potassium 6.5 milliequivalents, the plasma chlorides 88 milliequivalents, the serum sodium 133 milliequivalents and the plasma hemoglobin 3.7 milligrams per cent. The blood type was A Rh negative (ceddee) and the Anti Rh titre was 1;458,752.

Shortly after admission cystoscopy and ureteral catheterization disclosed no urine in the bladder or the kidneys. The patient was transfused with 500 cubic centimeters of blood on July 18 and again on July 19. The fluid intake was limited to 1000 cubic centimeters of sweetened tea, but neither orange nor tomato juice (high potassium content). Because of their protein sparing effect one ounce of Lipomul (a high caloric lipid mixture) was given every three hours as well as hard candy and butter balls. The elevated serum potassium was treated by the oral administration of one dram of carboxylic acid resin every three hours. On July 21 the oral medications were discontinued because of nausea and vomiting; and 1000 cubic centimeters of 50 per cent dextrose in distilled water and 150 units of regular insulin were administered through a polyethylene tube. On July 23 the serum potassium was 9.4 milliequivalents, the urea nitrogen of the blood was 205 milligrams per cent, the creatinine of the blood was 21 milligrams per cent, the carbon dioxide combining power of the plasma was 11 milliequivalents, the plasma chlorides were 79 milliequivalents. Because of the elevated serum potassium the members of the artificial kidney team (E. Flink, F. J. Lewis, R. Egdahl, M. Reiser) decided to attach the patient to the artificial kidney. After six hours the electrolyte imbalance of the blood had improved, the urea nitrogen of the blood was 72 milligrams per cent, the carbon dioxide combining power of the plasma was 20 milliequivalents, the plasma chlorides were 103 milliequivalents, the serum sodium was 147 milliequivalents and the serum potassium was 3.6 milliequivalents. Fifty grams of urea nitrogen were removed from her blood in six hours.

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The daily fluid intake was limited to 1000 cubic centimeters of 50 per cent glucose in distilled water and with 150 units of regular insulin intravenously. On July 27 she developed acute congestive heart failure and pneumonia which were treated by the medical service. Her weight was 60.8 kilograms. Continuous oxygen was given by means of a BLB mask, venesection was performed and penicillin, streptomycin, and aminophylline were administered. Intravenous fluids were replaced by sweetened tea equal in amount to 500 cubic centimeters plus the number of cubic centimeters of urine output, and high carbohydrate, high fat, nonprotein diet. By July 29 her condition was no longer critical. Her weight was 57.2 kilograms. Urine output was as follows: July 24 – 70 cubic centimeters, July 25 – 100 cubic centimeters, July 26 – 445 cubic centimeters, July 27 – 700 cubic centimeters, July 28 – 1020 cubic centimeters, July 29 – 1600 cubic centimeters, and on July 30 – 2300 cubic centimeters. On July 30, 1951, urea nitrogen of the blood was 203 milligrams per cent, carbon dioxide combining power of the plasma was 12 milliequivalents, plasma chlorides were 103 milliequivalents, serum potassium was 5.4 milliequivalents and serum sodium was 145 milliequivalents. The urinary excretion of sodium and chlorides was measured and replaced and urinary output was maintained at over 3500 cubic centimeters by adequate oral fluids. On August 7 diet restrictions were discontinued. Gradually the urea nitrogen of the blood decreased so that at the time of discharge on August 14, 1951 it was 27 milligrams per cent.

DISCUSSION

Whereas anti-A and anti-B antibodies occur naturally, Rh antibodies are a result of sensitization from pregnancy or transfusion. Since her five children were of Rh positive blood type and she had Rh negative blood we can assume that sensitization occurred during pregnancy; after she was transfused with blood of Rh positive type the anti-Rh titre was 1:458,752.

Despite the limited fluid intake of less than 1000 cubic centimeters daily, on July 27 she developed acute congestive heart failure and pulmonary edema. Her weight at that time was 60.8 kilograms, 1.5 kilograms more than on admission. Following further restriction of fluid intake, on July 29 all evidence of edema had disappeared and her weight at that time was 57.2 kilograms. Our mistake lay in assuming that she was not overhydrated at the time of admission, though there was no clinical evidence of edema.

Reactions to blood transfusions may be classified clinically as: one, simple febrile; two, pyrogenic; three, allergic or urticarial; four, gross bacterial contamination; five, transmission of disease; six, circulatory overload; seven, intravascular hemolysis and agglutination. Usually, the first three types are benign though deaths have been associated with severe pyrogenic reactions.

Infrequently, incompatible blood transfusions may be accompanied only by a fever. Usually there are three phases following the use of incompatible blood: first, headache, flushing, pain in the renal areas, rigor, fever, hives, precordial distress, nausea, vomiting, cyanosis, hypotension, bradycardia and circulatory collapse; then, oliguria, hemoglobinuria and uremia; finally, either recovery as late as 17 days following the reaction or death due to renal failure (hemoglobinuria).

Jaundice need not occur, but when present is indicative of functional liver impairment. Destruction of red blood cells, breakdown of other body tissues and impaired renal function produce an elevation of the serum potassium which may lead to electrocardiographic changes and even to cardiac arrest. The loss of potassium in vomiting is not enough to prevent a rise in its serum concentration though the serum chlorides may be reduced considerably.

The plasma hemoglobin is elevated in all hemolytic reactions; but because it is rapidly cleared from the plasma the test should be done promptly.

Treatment of the anuric patient is a real challenge. If the blood volume is low, transfusion of compatible blood is indicated. Fluid intake should be just enough to replace the insensible loss. Forcing fluids in an attempt to precipitate diuresis is foolhardy and can result in overhydration, pulmonary edema and death. Immediate decapsulation of the kidneys, administration of alkalis, and intravenous procaine solutions are for the most part unsuccessful. A protein sparing effect can be achieved by the use of a high carbohydrate, high fat, non protein diet (Lipomul, butter balls and hard candy, or infusion of 50 per cent dextrose and insulin through a polyethylene tube). When diuresis occurs there is usually a considerable loss of electrolytes which must be replaced by oral or parenteral means. During this period fluid intake is increased to prevent dehydration. Weighing the patient daily as well as daily physical examinations are effective guides as to degree of hydration. Because of the saturation of the body with nitrogenous wastes the urea nitrogen of the blood may continue to rise during the period of diuresis, only to fall rather slowly as the improved renal function catches up with this backlog. Potassium intoxication as evidenced by the electrocardiogram and by serum determinations may warrant more heroic measures. Intravenous hypertonic glucose and insulin will drive the potassium into the cells but it is only temporary. Oral administration of carboxylic acid resin while effective is usually not well tolerated by a patient who is already nauseated and vomiting. Peritoneal dialysis, intestinal lavage and the artificial kidney are effective in reducing the serum potassium.

Of the above mentioned methods intestinal lavage is the simplest and the materials needed are readily available. Of the approximately 70 milliequivalents of potassium in the secretions of the gastrointestinal

(Continued on page 584)

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INDEX TO VOLUME 72

ARTICLE INDEX

ABSTRACTS: Analgesics and pain threshold (R. E. Lee and C. G. Pfeiffer), 54; Anesthesia for labor (R. E. McDonald and W. K. Hoffman), 61; Aspects of pain therapy (E. M. Papper), 75; Coexistent rheumatic and arteriosclerotic heart disease (J. Chasnoff and A. Silver), 138; Control of postoperative pain in anorectal surgery (C. C. Tucker), 532; Gynecologic causes of pelvic pain (J. W. Douglas), 533; Hexamethonium for blood flow to foot (H. W. Schnaper, R. L. Johnson, E. B. Tuohy and E. D. Freis), 91; Local procaine block as an added measure to overcome venospasm during cardiac catheterization (S. N. Sancetta), 102; Neurosurgical aspects of headaches and pain in the head (G. Horrax), 532; Phantom limb pain associated with spinal analgesia (P. Toker), 100; Procaine for pain (L. Steine), 100; Studies on pain. II. Post-traumatic pain (J. F. P. Erasmus), 100; Studies on pain. III. Some observations on surgical treatment in 65 cases, 101, second part, 102; Surgical exploration in silent lung disease (R. H. Overholt), 215
Analgesic effect of roentgen rays, the, 55
Agenesis of anus and rectum, 238
Antihistamines, cortisone and ACTH in respiratory allergy, the, 135
American College Health Association News, 46, 114, 170, 226, 270, 308, 348, 396, 492, 542, 582
Amyloid disease, 8
Antimicrobial treatment of pulmonary tuberculosis, 180
Auditory projection technique for psychiatric research, an, 17

BIOLOGICAL effects of radiation and the factors which influence recovery, 403
Book Reviews: Advances in medicine and surgery, 540; Anesthesia in dental surgery (S. V. Mead), 533; Anesthesia in general practice (S. C. Cullen), 113; Annual report on stress, 1951 (H. Selye), 306; Antibiotic therapy (H. Welch and C. N. Lewis), 219; Atlas of normal radiographic anatomy, an (I. Meschan), 37; Cerebral mechanisms in behavior (L. A. Jeffress), 382; Chloroform: a study after 100 years (R. M. Waters), 113; Fluid balance, (C. A. Moyer), 266; Group treatment in psychotherapy (R. G. Hinckley), 306; Growing in the older years (W. Donahue and C. Tibbett), 266; Heart disease, its diagnosis and treatment (E. Goldberger), 491; Help yourself get well M. M. Pyle), 382; History of medicine in Ireland (J. Fleetwood), 164; Hope and help for the alcoholic (H. W. Lovell), 306; Introduction to statistical analysis, An (W. J. Dixon and F. J. Massey, Jr.), 37; Management of obstetrics difficulties, the (Paul Titus), 219; Marriage, moral and medical ethics (F. L. Good and O. F. Kelly), 306; Merck manual, the, 219; Modern medication of the ear, nose and throat (N. D. Fabricant), 37; Pathogenesis of tuberculosis, the (A. Rich), 577; Pharmacological basis of penicillin therapy (K. H. Beyer), 577; Physical medicine and rehabilitation for the clinician (F. Krusen), 306; Pioneer doctor (L. J. Moorman), 164; Planning the older years (W. Donahue and C. Tibbets), 37; Roentgen anatomy (David Steel), 37; Specialties in general practice (R. L. Cecil), 491; Special vector electrocardiography: clinical electrocardiographic interpretation (R. P. Grant), 382; Surgery of peripheral nerves (E. Seletz), 164; Surgical practice of the Lahey Clinic, 37; Textbook of orthopedics (M. B. Howorth), 540; Textbook of pharmacology (W. T. Salter), 491; Translation of Galen's Hygiene, A (R. M. Green), 219; Treatment of injuries to the nervous system (D. Munro), 540; Trends in gerontology (N. W. Shock), 306; Understanding children's play (R. E. Hartley, L. K. Frank and R. N. Goldenson), 266; White plague, tuberculosis, man and society (R. and J. Dubos), 577; Why children misbehave (C. W. Leonard), 266.
Brain mechanisms and behavior with special reference to the rhinencephalon, 567
Bronchography in chronic disease of the lung, 185

CANCER, a major child health problem, 231
Case presentation, 338
Chronic interstitial pneumonitis (clinicopathological conference), 334
Cirrhosis of the liver with hepatoma (clinicopathological conference), 522
Clinical evaluation of a new anti-asthmatic combination, 304
Clinical report on family planning, 555
Clinical uses of the artificial kidney, 1
Collagen diseases, 399
Cooper's ligament inguinal hernioplasties, 503
Curare in the treatment of tetanus, 300

DIAGNOSIS and treatment of dyslalia, 229
Diagnosis of carcinoma of the right colon, 473
Diagnostic and therapeutic nerve blocks, 76
Diagnostic criteria for coronary arteriosclerotic heart disease, 364
Drainage method for duodenal or pancreatic fistulae, 317

ECTOPIC pregnancy and attempted criminal abortion, 294
Editorials: Anesthesia and childbirth, 305; Hennepin County neonatal mortality study, 7A (December); Individual variation in tolerance of pain, 112; Less than half way, 216; Nursing shortage, the—a statement of the problem, 6A (September); Medical stewardship—a concept of student health service, 6A (October); Medicine and chauvinism, 6A (August); More or safer transfusions, 344; Personal tribute to Jacob G. Cohen, 162; Roentgen therapy for lip cancer, 264; We begin our 83rd year, 38; Widening horizons in general practice, 6A (November)
Education for childbirth in private practice, 274
Emotional problems in tuberculosis, 193
Encephalopathy, 249
Endometriosis, 296

Erythema multiforme exudativum, 152
Experimental atherosclerosis, part 1, 329, part 2, 372

FATAL case of diphtheria complicated by myocarditis and pericardial effusion, 252

GENERAL theory of pain, 482

HEMOGLOBINURIC nephrosis, 575
Hematologic manifestations of sarcoidosis, 33
Histaminic cephalgia, 92
Histoplasmosis—a case report, 208
History of blood transfusion, 319
Hodgkin's disease involving stomach (clinicopathological conference), 108
Hydranencephaly, 240
Hyperpotassemia, 105

INCIDENCE of diabetes mellitus and glycosuria in 19,358 college students, the, 479
Isolated myocarditis in children, 235

LANCET Clinical Reviews, 27, 33, 105, 108, 150, 152, 154, 208, 210, 212, 252, 256, 300, 334, 388, 377, 482, 522, 575

MANAGEMENT of ocular injuries, 125
Massive edema, 150
Medical editors and their work, 145
Medical management of bilateral adrenalectomized patients, 15
Medical Sciences Reviews, 329, 403, 567
Medullary nailing of femoral shaft fractures, 357
Menstrual variations associated with changes in altitude, 288
Monographs on pain, 99

NEW academy of obstetrics and gynecology (foreword), 273
Notes from a medical journey (series), 25, 103, 159, 205, 261, 302, 340, 380, 488, 536
Notes: obstetric and hematologic, 509

OBSERVATION on two children with diabetes mellitus and epilepsy, 242
Observations and therapy of peptic ulcer in young adults, 361
Obturator internus spasm as a cause of pelvic and sciatic distress, 283

PAIN as a psychiatric problem, 50
Painful anal lesions in intestinal disease, 530
Pain-relieving drugs, 67
Painful conditions of the upper extremity, 84
Pelvic pain from the point of view of a gynecologist, 62
Penicillin suppositories in abdominal and vaginal hysterectomies, 370
Perigastric abscess (clinicopathological conference), 212
Present status of ACTH and cortisone in rheumatic fever, 11
Prolonged intercostal nerve block in upper abdominal surgery, 200
Prolonged labor, 13
Polyarteritis nodosa—infarction of ileum due to polyarteritis nodosa, (clinicopathological conference), 377
Practical scheme for the treatment of urinary tract infections, 353
Program North Dakota State Medical Association, 265
Psychotherapeutic problems with university students, 142
Progress in insulin physiology, 516
Pyelonephritis and polyarteritis nodosa (clinicopathological conference), 27

RADIATION reaction in small bowel, 133
Reference function of a medical library, 565
Relief of pain in surgical operations and obstetrics, 72
Richard Everingham Scammon, 1883-1952, 505
Report of committee on tuberculosis, American College Health Association, 199
Rheumatic pneumonitis treated with cortisone, 210
Routine photoradiography in a general hospital, 189

SEASONAL dermatoses of spring and summer, 256
Section on Pain, 525
Simplified percutaneous angiography, 141
Subcutaneous injuries of the liver, 325
Successful management of the diabetic patient, 461
Suprapubic vesicourethral suspension for stress incontinence, 279
Surgical treatment of recurrent carcinoma of the cervix, 283
Surgical problems in rheumatic valvular heart disease, 545

TESTICULAR tumors, 486
Thoracic pain in cardiovascular disease, 58
Thrombosis of superior mesenteric artery and vein (clinicopathological conference), 154
Transactions of the North Dakota State Medical Association, 409
Treatment of carcinoma of the right colon, 476
Treatment of painful neuralgias of the head, 525
Treatment of poliomyelitis with a sympatholytic drug, 470
Tuberculin test as an evaluation of the future of tuberculosis, 198

UNIVERSITY and medical research, 560
Urological anesthesia, 139

VENEREAL disease problem among North American Indians, 513

WHAT'S past is prologue, 176
Whole defatted pancreatic substance in the treatment of psoriasis, 328

AUTHOR INDEX

Adams, Forrest H., Present status of ACTH and cortisone in rheumatic fever, 11
Anderson, Howard A., case presentation, 338; Histoplasmosis—a case report, 208
Anderson, R. J., What's past is prologue, 176

Baker, George S., Treatment of painful neuralgias of the head, 525
Banner, Edward A., Pelvic pain from the point of view of a gynecologist, 62
Bargen, J. Arnold (co-author), Painful anal lesions in intestinal disease, 530
Barker, Joseph M. (co-author), Diagnostic criteria for coronary arteriosclerotic heart disease, 364
Baronofsky, Ivan D. (co-author), Surgical problems in rheumatic valvular heart disease, 545
Bateman, C. V. (co-author), Subcutaneous injuries of the liver, 325
Beltz, M. E. (co-author), Subcutaneous injuries of the liver, 325
Bizzozero, O. J. (co-author), Whole defatted pancreatic substance in the treatment of psoriasis, 328
Boyd, Ann D. (co-author), Urological anesthesia, 139
Briggs, John Francis (co-author), Curare in the treatment of tetanus, 300
Brintnall, E. S., Surgical treatment of recurrent carcinoma of the cervix, 283
Brown, Spencer F., Diagnosis and treatment of dyslalia, 229
Bruch, Ernest, Progress in insulin physiology, 516

Cameron, Angus L., Roentgen therapy for lip cancer (editorial), 264
Carryer, H. M. (co-author), The antihistamines, cortisone and ACTH in respiratory allergy, 135
Corbus, B. C. (co-author), Urological anesthesia, 139
Cornatzer, W. E., Biological effects of radiation and the factors which influence recovery, 403
Coulter, Everett B., Radiation reaction in small bowel, 133
Creevy, C. D. (co-author), Hemoglobinuric nephrosis, 575; (co-author), Hyperpotassemia, 105; A practical scheme for the treatment of urinary tract infections, 353; (co-author), Testicular tumors, 486

Dargeon, Harold W., Cancer, a major child health problem, 231
Darner, C. B. (co-author), Clinical report on family planning, 555; Suprapubic vesicourethral suspension for stress incontinence, 279
De Lien, H. (co-author), Venereal disease problem among North American Indians, 513
Deters, Donald C. (co-author), Curare in the treatment of tetanus, 300
Doyle, James C., Ectopic pregnancy and attempted criminal abortion, 294
Dry, Thomas J., Thoracic pain in cardiovascular disease, 58
Durfee, Max L., Medical stewardship—a concept of student health service, 6A (October)

Egdahl, Richard H. (co-author), Clinical uses of the artificial kidney, 1
Ehrenberg, C. J., A new academy of obstetrics and gynecology (foreword), 273
Eisenstadt, William Sawyer, Clinical evaluation of a new anti-asthmatic combination, 304
Engel, Rudolph, Observation on two children with diabetes mellitus and epilepsy, 242

Fawcett, Robert M., Bronchography in chronic disease of the lung, 185
Flannery, Francis E. (co-author), Education for childbirth in private practice, 274
Flink, Edmund B. (co-author), Clinical uses of the artificial kidney, 1
Fortney, A. C., Medical management of bilateral adrenalectomized patients, 15
Fox, James Rogers, Incidence of diabetes mellitus and glycosuria in 19,358 college students, 479; Observations and therapy of peptic ulcer in young adults, 361
Fry, Donald (co-author), Cirrhosis of the liver with hepatoma (clinicopathological conference), 522

Gault, N. L. (co-author), Pyelonephritis and polyarteritis nodosa, 27; Hodgkins disease involving stomach, 108; Thrombosis of superior mesenteric artery and vein, 159; Perigastric abscess, 212; Chronic interstitial pneumonitis, 334; Polyarteritis nodosa—infarction of ileum due to polyarteritis nodosa, 377; cirrhosis of the liver with hepatoma, 522
Gillam, J. S. (co-author), Clinical report on family planning, 555; Suprapubic vesicourethral suspension for stress incontinence, 279
Good, M. G., General theory of pain, 482
Grinney, L. R., Endometriosis, 296

Hadley, J. Nixon (co-author), Venereal disease problem among North American Indians, 513
Halberg, Franz (co-author), Observation on two children with diabetes mellitus and epilepsy, 242
Hall, G. Howard, Treatment of carcinoma of the right colon, 476
Hammarsten, James F. (co-author), Pyelonephritis and polyarteritis nodosa, 27; Hodgkin's disease involving stomach, 108; Thrombosis of superior mesenteric artery and vein, 159; Perigastric abscess, 212; Chronic interstitial pneumonitis, 334; Polyarteritis nodosa—infarction of ileum due to polyarteritis nodosa, 377; cirrhosis of the liver with hepatoma, 522
Hammes, Ernest M. Jr., Pain-relieving drugs, 67
Hanlon, David G. (co-author), Hematologic manifestations of sarcoidosis, 33
Harris, Oliver J. (co-author), Whole defatted pancreatic substance in the treatment of psoriasis, 328
Hart, George M., Medullary nailing of femoral shaft fractures, 357
Haunz, E. A., Successful management of the diabetic patient, 461
Hewitt, Richard M., Medical editors and their work, 145
Hofmeister, F. J. (co-author), Endometriosis, 296
Horton, Bayard T., Histaminic cephalgia, 92
Huber, Carl P., Prolonged labor, 13
Hunter, C. Wilson (co-author), Clinical report on family planning, 555; Suprapubic vesicourethral suspension for stress incontinence, 279
Husni, May A. (co-author), An auditory projection technique for psychiatric research, 17

Icenogle, Grover D., Collagen diseases, 399

Johnson, O. W., The nursing shortage—a statement of the problem (editorial), 6A (September); Inaugural address, 436
Jackman, Raymond J., 530
Jacobs, Sydney, Routine photoradiography in a general hospital, 189

Katz, L. N. (co-author), Experimental atherosclerosis, part 1, 329, part 2, 372

Kaufman, S. Harvard, Psychotherapeutic problems with university students, 142
Keetel, William C. (co-author), Surgical treatment of recurrent carcinoma of the cervix, 283
Keys, Ancel, Notes from a medical journey, 25, 103, 159, 205, 261, 302, 340, 380, 488, 536
Keys, Thomas E., The reference function of a medical library, 565; Monographs on pain, 99
Kling, R. B., Isolated myocarditis in children, 235
Klüver, Heinrich, Brain mechanisms and behavior with special reference to the rhinencephalon, 567
Knight, Ralph T., Relief of pain in surgical operations and obstetrics, 72
Kremen, Arnold J., History of blood transfusion, 319
Koelsche, G. A. (co-author), The antihistamines, cortisone and ACTH in respiratory allergy, 135
Kolb, Lawrence, C., Pain as a psychiatric problem, 50
Koszalka, Michael F., Rheumatic pneumonitis treated with cortisone, 210
Koucky, Rudolph W., More or safer transfusions (editorial), 347
Krumbach, R. W., Testicular tumors, 486

Lam, Robert C., Agenesis of anus and rectum, 238
Lancaster, W. E. G., Presidential address, 434
La Vake, R. T., Notes: obstetric and hematologic, 509
Leddy, Eugene T., The analgesic effect of roentgen rays, 55
Leigh, R. E., Obturator internus spasm as a cause of pelvic and sciatic distress, 286
Lewis, F. John (co-author), Clinical uses of the artificial kidney, 1
Lubin, R. I. (co-author), Pyelonephritis and polyarteritis, 27; Hodgkin's disease involving stomach, 108; Thrombosis of superior mesenteric artery and vein, 159; Perigastric abscess, 212; Polyarteritis nodosa, infarction of ileum due to polyarteritis nodosa, 377
Lund, George W., A fatal case of diphtheria complicated by myocarditis and pericardial effusion, 252
Lundy, John S., Anesthesia and childbirth (editorial), 305
Lundy, John S., Anesthesia and childbirth (editorial), 305; (co-author), Diagnostic and therapeutic nerve blocks, 76; Foreword to pain issue, 49; Individual variation in tolerance of pain (editorial), 112
Lytle, Francis T., Diagnosis of carcinoma of the right colon, 473

Macaulay, Warren L., Seasonal dermatoses of spring and summer, 256
MacCarty, Collin S., Painful conditions of the upper extremity, 84
Martin, Raymond S. (co-author), A drainage method for duodenal or pancreatic fistulae, 317
Mattson, Hamlin, Cooper's ligament inguinal hernioplasties, 503
Maytum, C. K. (co-author), The antihistamines, cortisone and ACTH in respiratory allergy, 135
Mazur, Bernard A. (co-author), Hydranencephaly, 240
McGill, James W. (co-author), Carcinoma of the ovary in children, 232
McQuarrie, Irvine, Observation on two children with diabetes mellitus and epilepsy, 242
Miller, H. Lloyd (co-author), Education for childbirth in private practice, 274
Myers, J. A., A personal tribute to Jacob G. Cohen (editorial), 162; We begin our 83rd year (editorial), 38; Less than half way (editorial), 216

Nelson, Wallace W., Penicillin suppositories in abdominal and vaginal hysterectomies, 370
Noel, Oscar F. (co-author), A drainage method for duodenal or pancreatic fistulae, 317
Novak, Julius B., The tuberculin test as an evaluation of the future of tuberculosis, 198
Nuessle, William F., Massive edema, 150
O'Donnell, John J. (co-author), Treatment of poliomyelitis with a sympatholytic drug, 470
Orme, Harry W., Erythema multiforme exudativum, 152

Palchanis, William T., Report of committee on tuberculosis, American College Health Association, 199
Perkins, James E., Foreword to April issue, 175
Pender, John W. (co-author), Diagnostic and therapeutic nerve blocks, 76
Peters, G. A. (co-author), The antihistamines, cortisone and ACTH in respiratory allergy, 135
Pick, R. (co-author), Experimental atherosclerosis, part 1, 329, part 2, 372
Pitts, Forrest W. (co-author), Antimicrobial treatment of pulmonary tuberculosis, 180.
Powell, Lewis C., A drainage method for duodenal or pancreatic fistulae, 317
Prickman, L. E. (co-author), The antihistamines, cortisone and ACTH in respiratory allergy, 135
Puderbach, W. J. (co-author), Prolonged intercostal nerve block in upper abdominal surgery, 200
Reiser, Milton P. (co-author), Clinical uses of the artificial kidney, 1; Hemoglobinuric nephrosis, 575; Hyperpotassemia, 105; Testicular tumors, 486

Raffucci, Francisco, L. (co-author), Clinical uses of the artificial kidney, 1
Randall, John H. (co-author), Surgical treatment of recurrent carcinoma of the cervix, 283
Rodbard, S. (co-author), Experimental atherosclerosis, part 1, 329, part 2, 372

Shaftel, H. E., Prolonged intercostal nerve block in upper abdominal surgery, 200
Sher, David, Encephalopathy, 249
Sikkema, Stella H., Menstrual variations associated with changes in altitude, 288
Smiley, Gordon L., Simplified percutaneous angiography, 141
Stamler, R. (co-author), Experimental atherosclerosis, part 1, 329, part 2, 372

Tempel, Carl W. (co-author), Antimicrobial treatment of pulmonary tuberculosis, 180
Thurmon, Francis (co-author), Whole defatted pancreatic substance in the treatment of psoriasis, 328
Top, Franklin H., Treatment of poliomyelitis with a sympatholytic drug, 470
Tudor, R. B., Isolated myocarditis in children, 235

Varco, Richard L. (co-author), Surgical problems in rheumatic valvular heart disease, 545
Visscher, Maurice B., Medicine and chauvinism (editorial), 6A (August)

Wangensteen, Owen H., The university and medical research, 560
Wasemiller, E. R. (co-author), Subcutaneous injuries of the liver, 325
Watts, Margaret L., Current trends in vital statistics registration, 518
Wendland, John P., Management of ocular injuries, 125
Wilhelm, Warren F. (co-author), Hematologic manifestations of sarcoidosis, 33
Williamson, Paul, Widening horizons in general practice (editorial), 6A (August)
Wilmer, Harry A. (co-author), An auditory projection technique for psychiatric research, 17; Emotional problems in tuberculosis, 193; Richard Everingham Scammon, 1883-1952, 506
Wiltse, G. L. (co-author), Subcutaneous injuries of the liver, 325
Wold, Lester E., Amyloid disease, 8

Yater, Wallace M. (co-author), Diagnostic criteria for coronary arteriosclerotic heart disease, 364

Ziegler, Mildred (co-author), Observation on two children with diabetes mellitus and epilepsy, 242

BOOK REVIEWS

★

The Pathogenesis of Tuberculosis, by ARNOLD R. RICH, M.D., Baxley professor of pathology, the Johns Hopkins University School of Medicine, 1951. Second edition. Springfield, Illinois: Charles C Thomas, Publisher. 1023 pages. $15.00.

The reviewer has read this book with the same enthusiasm that he had when he reviewed the first edition in 1944. In a clear and scholarly fashion Dr. Rich has crystallized the pertinent information relating to the pathogenesis of tuberculosis. The initial chapters are concerned with a discussion of the chemistry of the tubercle bacillus, the different types of tubercle bacilli and the problem of variations in virulence. He then plunges into a review of the important subject of native resistance, which is followed by a presentation of acquired resistance. He presents an interpretation of the phenomenon of hypersensitivity, and also some of the immune mechanisms that participate in the defense of the host. The discussion of the basic tissue reactions in chapter 18 constitutes one of the highlights of the book. There is also a provocative presentation of the question of exogenous or endogenous infection. He concludes his work with a discussion of the outlook for tuberculosis in the future, and ends up with the somber note that tuberculosis is still a major cause of death in young adults. A most valuable contribution is the bibliography of 1500 references.

The title of this book correctly states what one can anticipate from the contents. It is not primarily a treatise on the clinical aspects of tuberculosis, nor are the epidemiologic features of the disease stressed. But it can be highly recommended not only for physicians, but also for students of microbiology and of infectious diseases in general. The book is well illustrated and indexed. The exquisite workmanship and printing of the volume reflect again the skill of the publisher. The only major criticism that can be offered is that the size of the volume makes it a bit unwieldy. The style of the author is clear but repetitive. A reorganization of some of the sections and a striving for brevity would result in a considerable reduction in the number of pages—and perhaps the cost. W.W.S.

Pharmacological Basis of Penicillin Therapy, by KARL H. BEYER, Ph.D., M.D., F.A.C.P., 1950. Springfield, Illinois: C. C. Thomas Company. 198 pages. $4.00.

This monograph is, in general, an excellent treatise on the pharmacology of penicillin and its application in the proper clinical use of this agent. The book is well organized, with subheadings for easy reading and reference. Summaries at the beginning of each chapter are helpful. Controversial points are discussed from all sides, and there are many references to the current literature throughout the book. A minor criticism is the disproportionate amount of space devoted to inhibition of penicillin excretion. This book should be read by every practitioner.
S.M.F.

•

The White Plague, Tuberculosis, Man and Society, by RENE and JEAN DUBOS, 1952. Boston: Little, Brown and Company. 277 pages. $4.00.

By reason of long experience and outstanding accomplishment in the field of bacteriology and closely related fields, the authors were especially qualified to write this book. Dr. Rene Dubos is known everywhere for the biography of *Louis Pasteur*. His many outstanding contributions in bacteriology and pathology have won numerous honorary degrees from some of the world's most famous institutions, as well as the editorship of the *Journal of Experimental Medicine*, the Trudeau Medal of the National Tuberculosis Association, and currently the presidency of the Society of American Bacteriologists. Since graduating from Ohio State University, Jean Dubos has had wide experience in bacteriology in industry, in the Harvard School of Medicine and the Rockefeller Institute for Medical Research.

Those who believe that man's battle against tuberculosis is about won, will be surprised to read that in the world, every year, from three to five million people die from tuberculosis, and that some 50 million constantly suffer from the disease and transmit tubercle bacilli to others.

The first five chapters are devoted to tuberculosis in the 19th century, when the disease reached epidemic proportions in the western world and caused as many as 30 per cent of all deaths in some places. Brief sketches are presented of the lives of famous persons such as Frederic Chopin, Henry David Thoreau, Robert Louis Stevenson and John Keats, whose work was interrupted and untimely death was caused by this disease. Tuberculosis struck down people everywhere without regard to position or status in life. Brief sketches are also presented of the lives of persons who made significant discoveries and contributions to the knowledge of this disease such as Laennec, Koch and Roentgen.

Part II is devoted to the evolution of our knowledge of the cause of tuberculosis, including the discovery of the tubercle bacillus. Treatment and prevention are presented in Part III. Various methods that have been introduced through the centuries are described and the most modern forms of treatment, including all of the newer drugs, surgical procedures, etc., are included. Emphasis is placed upon the fundamental methods that have led almost to eradication of the disease in animals and people in certain parts of the world, but where, without these methods, the disease continues to exist unabated. The fourth part of this book is devoted to tuberculosis and society.

This is one of the most fascinating and at the same time most authentic books that has ever been published on tuberculosis. It is so written that it is of true value to professional workers and at the same time can be read with profit by others. Physicians who read this book will prescribe it as a part of the treatment of their tuberculous patients. J.A.M.

American College Health Association News . . .

W. Goodricke Donald, M.D., director of the Student Health Service at the University of California, reports the following activities of the health services of the various University of California campuses:

Occupational Health Program

On January 25, 1952, the Board of Regents authorized the employment of an Industrial Health Safety Engineer, together with technical and clerical assistance, to make a complete survey of occupational health hazards on all campuses of the University of California. On April 1, 1952, Mr. Fred Ingram took up his duties as chief engineer and administrative head of the new Department of Occupational Health. To date the emphasis has been placed on gathering of survey data, consultation with individual departments on the various campuses, studies of workroom conditions, and making recommendations for alleviating hazardous conditions.

Radiation Safety Program

As part of the University's program of protecting personnel who work with radioactive materials, a system of physical examinations for all employees and students exposed to ionizing radiation was instituted on the Berkeley, Los Angeles, and Davis campuses. It consists of (1) preplacement medical examination, including physical examination, 14 x 17 chest x-ray, complete blood count and urinalysis, (2) complete blood count and urinalysis every nine months, (3) physical examination, chest x-ray, complete blood count and urinalysis every eighteen months, (4) complete examination at time of termination of work. To date 382 of these examinations have been completed.

Chest X-rays on Students Working in Homes

Following the discovery of tuberculosis in a student employed in a home where there were children, a program of chest x-ray examinations was set up last year to protect the households of people employing University students. Applicants for work as baby sitters or part-time or full-time help in homes are referred by the Bureau of Occupations to the Student Health Service. A chest x-ray is taken, and the student is certified by the roentgenologist as being free from tuberculosis. A case of recently activated tuberculosis was discovered last month through this procedure, proving the worth of the program.

* * *

We take pleasure in welcoming another new member into the Association—*Chico State College*, Chico, California. The college has an enrollment of 751 men and 519 women students. William E. Connor, M.D., is the director of the student health service, and Miss Isabel Deveny, R.N., is the full time nurse on the staff. They, along with Dean Hugh Bell are authorized to represent the student health service.

* * *

Wallace W. Turner, M.D., an alumnus of the University of Massachusetts, Yale Medical School, and the United States Air Force, is assisting E. J. Radcliffe, M.D., of the University of Massachusetts.

* * *

New additions to the medical staff of the Health Service of the Massachusetts Institute of Technology include two full-time physicians, Dr. Willard Dalrymple in internal medicine and Dr. Robert L. Nelson in psychiatry. New part-time appointments in surgery are Drs. Glenn E. Behringer and James M. Doonan.

* * *

Mrs. Fannie A. Miller is the new Health Counselor at St. John's University, Brooklyn, New York, and will represent the University in the American College Health Association.

* * *

B. W. Lafene, M.D., Director at Kansas State College, reports two new full time staff members—Betsy Anne Ledbetter, M.D., and Suleyman Cullu, M.D.

* * *

Max L. Durfee, M.D., President, has appointed three important committees as follows:

1. A Constitution Revision Committee with Ralph Canuteson, M.D., as chairman
2. The Physician Training Program with Irvin Sander, M.D., as chairman
3. Health Service Evaluation for Accreditation with S. I. Fuenning, M.D., as chairman.

* * *

A request has come from the John Crerar Library for a set of our Proceedings. The library recently received three copies of the Proceedings as a gift and wanted to complete the set. This library, located in Chicago, is a depository for books on science, technology, and medicine.

* * *

The Association has had thirty annual meetings. New York City has been the host nineteen times and Chicago three. Other convention cities with one meeting each include: Ann Arbor, Boston, Cincinnati, Detroit, Minneapolis, New Orleans, San Francisco and Washington, D.C. The thirty-first meeting will be held in Columbus, Ohio, in May, 1953. We hope that many of you are planning to be present.

* * *

The activities of the college nursing committee during the past two years have been directed to developing standards of personnel policies, salaries, functions, and educational preparation. Miss Muriel Farr, Bryn Mawr, chairman of the college nurses, reports that meetings are being held in New York City, Washington, D. C., Nashville, Amherst and Cambridge, Baton Rouge, and Buffalo. The purpose of these sectional meetings is to enlist the help of many college nurses and physicians, too, if possible, in order to solve some of the problems of the college nurse.

The nurse in the smaller colleges has a greater number of problems than those nurses in the larger universities because few of the small institutions employ a full time physician and they are also financially unable to employ a second nurse. It follows that the nurse carries more responsibility for diagnosis and treatment of minor illnesses. Standing orders cannot cover every contingency. Furthermore, the college nursing section believes that these problems can only be solved with the help of the college physician.

In spite of the differences in duties, the college nurses are making an attempt to set up general policies and standards to serve as a guide for both large and small institutions. The nursing committee suggests that the college nurse be informed of the meetings of the American College Health Association and local medical meetings and that she be encouraged to attend.

News Briefs . . .

North Dakota

A MEETING of the North Dakota-Manitoba Urological Society was held in conjunction with the North Central Section at Minneapolis on October 10. Dr. Ned Cook spoke on interesting features of his recent European tour. The following officers were appointed for the coming year: president, Dr. Earl Stephenson of Winnipeg; vice-president, Dr. Joseph Sorkness, Bismarck; and secretary-treasurer, Dr. L. F. Pine, Devils Lake. Plans were made for a meeting at Menaki, Manitoba in June 1953 at the time of the Canadian Urological Association convention.

* * *

DEDICATION ceremonies for the new St. Michaels' hospital at Grand Forks, North Dakota were held on October 5. Built at a cost of $4,000,000, the building replaces the original institution which was opened in 1907. The 200-bed hospital is administered by the Sisters of St. Joseph of Carondolet and Dr. W. H. Witherstine is chief of staff.

Old St. Michael's hospital opened in 1907 without a formal medical staff. In 1907 the first staff of 20 physicians was organized by Dr. R. D. Campbell. Dr. W. H. Witherstine is the second and present chief of staff, and he and Drs. Nelson A. Youngs, W. A. Liebeler, T. Q. Benson and R. E. Mahowald make up the advisory board of the hospital.

Other staff members are Drs. H. D. Benwell, J. D. Cardy, A. E. Culmer, Jr., W. C. Dailey, John D. Folsom, D. E. Fritzell, R. O. Goehl, Charles Graham, John Graham, E. A. Haunz, Frank A. Hill, A. C. Kohlmeyer, R. E. Leigh, John H. Moore, O. Harold Muus, Robert C. Painter, Charles B. Porter, Victor S. Quale, H. O. Ruud, M. B. Ruud, J. E. Ruud, A. K. Saike, John A. Sandmeyer, Louis B. Silverman, Joseph J. Stratte, G. G. Thorgrimsen, Robert C. Turner, R. W. Vance, Philip H. Woutat, A. F. Jensen, Phil R. Berger, W. E. Cornatzer, W. W. Nelson, Jack W. Rever, and Y. Tsumagari.

* * *

A FALL DRIVE for the community hospital building fund is under way in Hillboro, with the focus on the rural population of the community. A substantial sum has already been raised, and a number of fund raising programs and benefits are planned for the future.

* * *

OVER 2000 persons attended the dedication of the new $250,000 McIntosh County Memorial Hospital at Ashley Sunday, October 26. Chief speaker at the dedication ceremonies was Dr. N. O. Brink, Bismarck. Dr. Karl Oja will serve as chief surgeon and physician of the hospital.

* * *

New locations and appointments . . .

DR. FLOYD E. WOLFE, who has practiced at Oakes since 1931, has established a new practice at East Battle Lake, Minnesota.

* * *

DR. EDWIN O. WICKS of Valley City has been appointed to the medical staff at North Dakota State Hospital in Jamestown. Son of Dr. and Mrs. F. L. Wicks of Valley City, Dr. Wicks attended the universities of North Dakota, Arizona, Michigan, Minnesota and Emory University in Atlanta, Georgia. He recently served as chief of preventive medicine with the 12th Air Force in Europe.

DR. JOHN E. SWEENEY, a graduate of Johns Hopkins University medical school, and who has been serving a residency in Marshfield, Wisconsin, has joined the department of internal medicine of the Fargo Clinic.

* * *

DR. R. J. RODRIGUEZ, a graduate of Havana University, Cuba, has joined the staff of the North Dakota State Hospital at Jamestown.

* * *

DR. M. ALAN HAYWARD, who came to Ellendale to establish a medical practice, moved to Gackle on October 21 for practice there. Dr. Hayward is a graduate of the University of Manitoba college of medicine.

Minnesota

FOUR MINNESOTA DOCTORS were named "Top Flight GPs" at the refresher course of the Minnesota Academy of General Practice which was held at Hotel Radisson in Minneapolis on October 29. They were: Dr. Albert E. Ritt, St. Paul, who was also the academy's "Award Winner" for 1951; Dr. Aaron Friedell, Minneapolis, Dr. Roger G. Hassett, Mankato; and Dr. Willis L. Herbert, Minneapolis.

* * *

DR. MAURICE B. VISSCHER, head of the University of Minnesota physiology department, was elected director of the American Cancer society region IV, which includes Minnesota, Illinois, Indiana, Iowa, Michigan and Wisconsin.

* * *

TEN MINNEAPOLIS PHYSICIANS were inducted as fellows of the American College of Surgeons at recent ceremonies in New York. They are, Dr. Samuel S. Beirstein, Lyman B. Clay, Edgar G. Ingalls, Arnold J. Kremen, Floyd J. Lewis, Virgil J. P. Lundquist, Melvin J. Nydahl, Lloyd F. Sherman, Joseph P. Spano and John P. Wendland.

Also inducted was Dr. Richard L. Varco, St. Paul.

* * *

DR. JOHN L. MCKELVEY attended the meeting of the Southeastern States Cancer Seminar from October 30 to November 1 in Tampa, Florida, where he will speak on "Diagnosis and Treatment of Carcinoma of the Vulva and Vagina" and "Diagnosis and Treatment of Carcinoma of the Cervix."

* * *

DR. JOHN REITMANN has been appointed head of the Anoka State hospital. A 1945 graduate of the University of Minnesota medical school, Dr. Reitman has been acting superintendent since the death last July of Dr. Edmund W. Miller. Dr. Kenneth Douglas, clinical director at the Willmar state hospital, was appointed superintendent at Sandstone.

* * *

DR. GEORGE E. MOORE, University of Minnesota surgeon, has been appointed director of the New York State health department Roswell Park memorial institute at Buffalo.

* * *

DR. C. J. WATSON and Dr. Frederick W. Hoffbauer attended a Commission on Liver Disease on September 13 and 14. Following this, Dr. Watson attended the meeting of the American Clinical and Climatological Society. At this meeting he presented a paper on "Experimental Porphyria with Implications for the Human

Disease." Doctors Rudi Schmid and Samuel Schwartz are co-authors of this paper.

* * *

Drs. Lewis Thomas, Lewis Wannamaker, and Floyd Denny visited Fort Warren Air Force Base, Cheyenne, Wyoming, on October 30 and 31 as consultants to the Surgeon General to advise on future activities of the Streptococcal Disease Laboratory there and to report on research now in progress at the University of Minnesota Heart Hospital.

* * *

Reports from Mankato indicate that St. Joseph's hospital is expected to be ready for partial occupancy in late March or early April, 1953. Other hospital-minded communities include Sandstone, which is having its first meeting to plan a hospital for Pine county; Aitkin, which has submitted first sketches of a community hospital to the United States Public Health Service as a step in obtaining a federal grant; Cloquet, which is talking over plans for a Carlton county hospital; Bemidji, where Bemidji Lutheran hospital is calling for bids on a new 25-bed wing; and Detroit Lakes, which has announced a drive for $350,000 for a new addition to Lake Region hospital.

South Dakota

Thirty doctors of Black Hills District Medical Society heard a discussion on the Rh factor at a meeting at Sanator on October 14. Guest speaker was Dr. Brooks Renney of Yankton.

* * *

Bids were to be opened on October 24 at Yankton for the proposed construction of a new modern 80-bed hospital for tubercular patients.

* * *

Dr. Bruce Brookman of Blytheville, Arkansas, is now associated with Dr. R. W. Honke in the practice of medicine at Wagner. Dr. Brookman took his first medical training at the University of South Dakota, later was graduated from the University of Tennessee.

* * *

Dr. R. Leonard Carefoot, a native of Ontario, Canada and a graduate of the University of Toronto medical school, has joined the staff of St. John's hospital, Huron, as director of the pathology department.

Iowa

The new $2,500,000 St. Luke's Methodist hospital at Cedar Rapids was dedicated with formal ceremonies on Tuesday, October 21. Although the new section has been in operation since last December, remodeling of the former west wing was finished only recently. The new facility is now completely in operation.

Wisconsin

Dr. Joseph B. Bounds, manager of the Tomah Veterans Hospital has been transferred to the Veterans Administration at Jefferson Barracks, St. Louis, Missouri. Dr. Bounds will be replaced by Dr. Benjamin F. Jackson, present chief of professional services at the VA hospital, Fort Lyons, Colorado. Dr. Jackson is a graduate of the University of Colorado Medical School.

Deaths . . .

Dr. William F. Bushnell, 70, physician at Elk Point, South Dakota, died October 6 at a Sioux City hospital. Dr. Bushnell, a graduate of the University of Iowa school of medicine, had practiced at Elk Point for the past 49 years and served as Union county health officer for the past 25 years.

* * *

Dr. B. W. Lemery, 78, a pioneer resident and early physician at Inkster, North Dakota, died early in October at Grand Rapids, Michigan, where he had lived with his sons for a short time. Dr. Lemery was born at Morningsville, Ontario, and came to Dakota territory in 1879.

* * *

Dr. William D. Lyle, Forman, North Dakota, died on October 10. Dr. Lyle was born in 1870, was graduated from Queen's University at Kingston, Ontario, and was licensed in North Dakota in 1906. He practiced in Havana, North Dakota for many years.

* * *

Dr. J. F. Hanna, Fargo, North Dakota, died October 14. Dr. Hanna had practiced in Fargo for 37 years.

* * *

Dr. Jacob H. Fjelde, also of Fargo, North Dakota, died on October 17. Dr. Fjelde had practiced in Fargo as an obstetrician since 1926.

* * *

Dr. Elmer F. Lundquist, Minneapolis, died October 18. A lifelong Minneapolis resident, Dr. Lundquist was a graduate of University of Minnesota medical school and a member of the staff of Swedish hospital.

* * *

Dr. John Grogan, Wadena, Minnesota, died on October 22. Dr. Grogan joined the Wadena clinic in 1925 after practicing for a short time in Flaxton, North Dakota.

HEMOGLOBINURIC NEPHROSIS*

(Continued from page 576)

tract each 24 hours almost all is resorbed. Intestinal lavage prevents the resorption of the potassium in the intestinal secretions. The ideal perfusate solution should remove a maximum amount of potassium and nitrogenous products, correct the imbalance of the other electrolytes of the body and remove fluid from the overhydrated patient. The composition of a liter of the solution is: 6 grams of sodium chloride, 3 grams of sodium bicarbonate, one tenth gram of calcium gluconate, and 20 grams of glucose. More glucose or magnesium sulfate may be added if dehydration is desired. The perfusate solution is dripped at a rate of 4 to 6 liters in 24 hours into a Levine tube which is placed in the stomach. Aspiration of the fluid is by means of a Miller-Abbott tube placed five feet beyond the ligament of Treitz and attached to Wangensteen suction apparatus. The procedure is usually well tolerated.

The severity of the reaction following transfusion of incompatible blood is roughly proportional to the amount of blood received; but the real clinical problem is to keep the patient alive until regeneration of the damaged renal tubules permits resumption of effective renal function. The greatest dangers lie in overhydration and imbalance of electrolytes.

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Texas Rep. Biol. & Med.,
9:764, 1951

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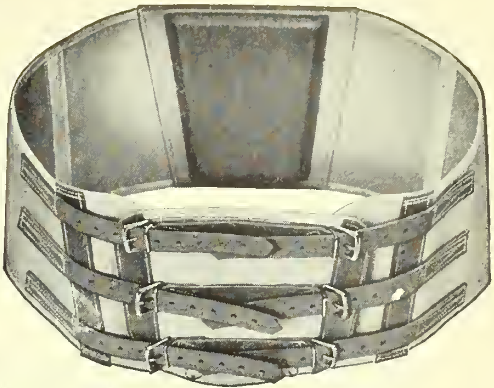

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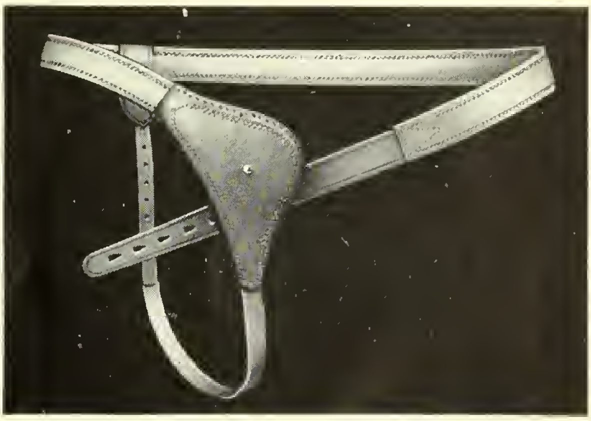

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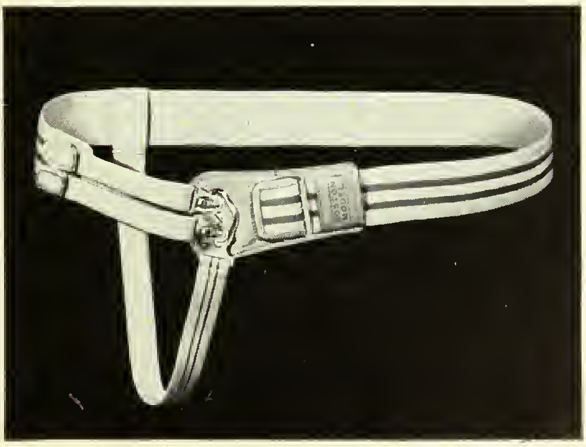

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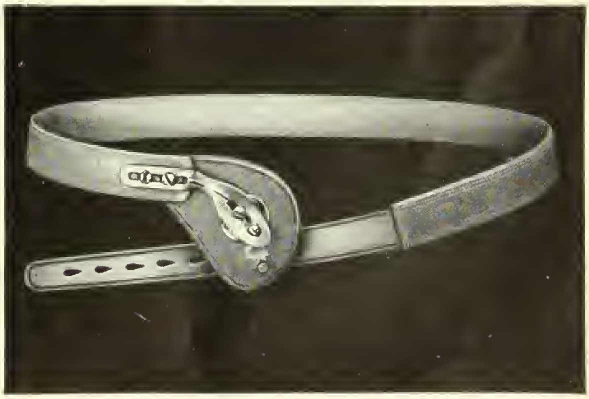

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- Gallbladder Surgery, Ten Hours, starting April 20
- Surgery of Colon and Rectum, One Week, starting March 2
- General Surgery, One Week, starting February 9
- General Surgery, Two Weeks, starting April 20
- Fractures and Traumatic Surgery, Two Weeks, starting March 2

GYNECOLOGY—Intensive Course, Two Weeks, starting February 16 — Vaginal Approach to Pelvic Surgery, One Week, starting March 2

OBSTETRICS—Intensive Course, Two Weeks, starting March 2

PEDIATRICS—Intensive Course, Two Weeks, starting April 6

MEDICINE—Intensive General Course, Two Weeks, starting May 4 — Electrocardiography and Heart Disease, Two Weeks, starting March 16 — Allergy, One Month and Six Months, by appointment

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Notices . . .

UNIVERSITY OF MINNESOTA CONTINUATION COURSES

A course in *Endocrinology* will be presented on December 4 to 6, and will include discussions of recent advances in the clinical use of ACTH and cortisone, the treatment of diabetes mellitus, and other common endocrine disorders. Dr. Dwight J. Ingle, pharmacology research, the Upjohn Company, Kalamazoo, Michigan, will be guest faculty member for the course. Dr. Ingle will present the JOURNAL-LANCET lecture on December 4.

A continuation course in *Anesthesiology for General Physicians* will be presented on January 8 to 10. Visiting faculty members include Dr. Donald E. Hale, director, department of anesthesiology, Cleveland Clinic, Cleveland, Ohio; Dr. Sidney O. Orth, professor and director of the department of anesthesiology, University of Wisconsin Medical School; and Dr. Daniel C. Moore, chief of the anesthesiology section, Virginia Mason Hospital, Seattle, Washington. Dr. Ralph T. Knight, director of the division of anesthesiology, will direct the course.

A course in *Ophthalmology for Specialists* will be held January 19 to 24. Director for the course is Dr. Erling W. Hansen, professor and director of the division of ophthalmology. Dr. Kenneth C. Swan, professor and head of the department of ophthalmology of the University of Oregon Medical School, is a visiting faculty member.

Pediatric Neurology is the subject of a course to be held January 26 to 31, and is designed for pediatricians, neurologists and physicians engaged in general practice. Faculty include Dr. Paul C. Bucy, professor, department of neurology and neurological surgery, University of Illinois; Dr. Margaret H. D. Smith, assistant professor, department of pediatrics, Tulane University, and Dr. Douglas Buchanan, associate professor, department of pediatrics, University of Chicago. Dr. Irvine McQuarrie, head of the department of pediatrics, is director of the course.

* * *

MINNESOTA DEPARTMENT OF HEALTH OFFERS PATHOLOGICAL CONFERENCES

The Minnesota Department of Health is offering a new type of program in professional education for physicians, consisting of pathological conferences on cancer and heart disease as a part of regular hospital staff meetings. These conferences are being offered to hospital medical staffs throughout the state. Conferences are sponsored by the Minnesota Medical Association, University of Minnesota Medical School, Minnesota Cancer Society, Minnesota Heart Association as well as the Minnesota Department of Health.

* * *

PRIZE FOR PAPER ON DIABETES

The American Diabetes Association offers a $250.00 prize to medical students and interns for a paper on any subject relating to diabetes. Manuscripts must be submitted on or before April 1, 1953 to the Editorial Offices of *Diabetes*: The Journal of the American Diabetes Association, 11 West 42nd Street, New York 36, N. Y.

* * *

INFANTILE PARALYSIS FOUNDATION FELLOWSHIPS

The National Foundation for Infantile Paralysis announces the availability of a limited number of postdoctoral fellowships in the field of public health and preventive medicine. Complete information concerning qualifications and applications may be obtained from the Division of Professional Education, the National Foundation for Infantile Paralysis, 120 Broadway, New York 5, N. Y.

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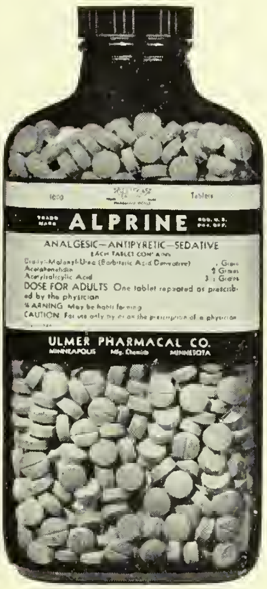

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THE UNIVERSITY AND MEDICAL RESEARCH

(Continued from page 564)

research, you may find that you are embracing only the effigy of what was once a man, for his soul may vanish when life becomes dull and drab without the driving excitement of research.

THE FUTURE

A century ago, when our grandfathers were hewing their way out of the wilderness here, no one dreamed that 100 years would see the transformation of our University into a great center of learning. The Gopher Prairie State has come of age. The future of the University is in our own hands. The full realization of its promise demands the loyal and devoted support of all its citizens. And when as a family of nations, we learn to master the most difficult of all the arts and sciences—that of living at peace with one another, medical research will prove an even more important agent in bringing improved health and greater happiness to men.

As we conclude the first century of the University's existence with the celebration of this great honor which has come to two of its distinguished scientists, let us reaffirm the faith of our fathers and reconsecrate ourselves to our solemn tasks. The University of Minnesota:

> "Founded in the Faith that Men are Ennobled by Understanding,
> Dedicated to the Advancement of Knowledge and the Search for Truth,
> Devoted to the Instruction of Youth and the Welfare of the State."

And now, as we contemplate the prospects of the new century which is just dawning for the University, while clinging to the faith of our fathers let us enlarge our vision and extend our perspective beyond the borders of the state—yes, beyond the boundaries of our nation, to other countries and their peoples, where some of our weary and discouraged boys from Minnesota are now, or have been before. Sympathy is the only universal chemical solvent. Not bloodbaths, nor the purge of men, money, or moral values will restore order in the world. Samaritanism is the only catalyst that can weld and fuse the nations and the peoples of the world into one brotherhood. In the universities of the world, as in the universe itself:

" 'tis always morning somewhere in the world."

May the long shades of night and the curse of mediocrity never descend on the University of Minnesota. And may the University never extend its laurel wreath for mediocre accomplishment!

THE REFERENCE FUNCTION OF A MEDICAL LIBRARY

(Continued from page 566)

But mere translation is not enough. The library should keep copies of the translations and eventually catalog them by author and subject. Eventually, also, it would be desirable to publish lists of available translations so that other institutions could borrow them as needed.

PREPARATION OF EXHIBITS

The preparation of exhibits of special interest to the staff is another way to add to the library's interpretive function. As many of you who have prepared exhibits know, not only is this profitable to the clientele but especially to the individual who makes up the exhibit.

THE WRITING OF HISTORICAL PAPERS

The history of medicine is fascinating to many librarians as well as to several physicians. Pursuit of the subject should certainly be encouraged among librarians. In telling the story of medicine, care should be taken to go to original sources. Several errors in the historical field are being perpetuated. The librarian who is trained in historiography can contribute greatly to this field by writing on historical topics based on material from original sources and thus correcting errors that have crept into print and have confused readers.

SUMMARY

A number of methods that librarians have at their disposal for interpretation of their resources have been suggested. In brief, these consist of (1) making material of easy access, (2) teaching the use of the library, (3) defining the scope of reference work, (4) suggesting a method of keeping references up-to-date, (5) compilation of bibliographies and of special lists of books, (6) assistance with translations, (7) preparation of exhibits and (8) writing of historical papers.

In these times of great prosperity, physicians are so busy in medical practice that they are not using the library as much as formerly. This is to be regretted and is something of immediate concern to librarians. It is not enough that librarians preserve the literature of medicine, and that they offer what they can to help readers in their use of library materials. Their concern is how, in ways that I have not mentioned, physicians can be brought into actual contact with books and journals so that they will read and profit by the most recent advances in medicine. And in turn librarians will profit and be happy by having their libraries used to the fullest extent.

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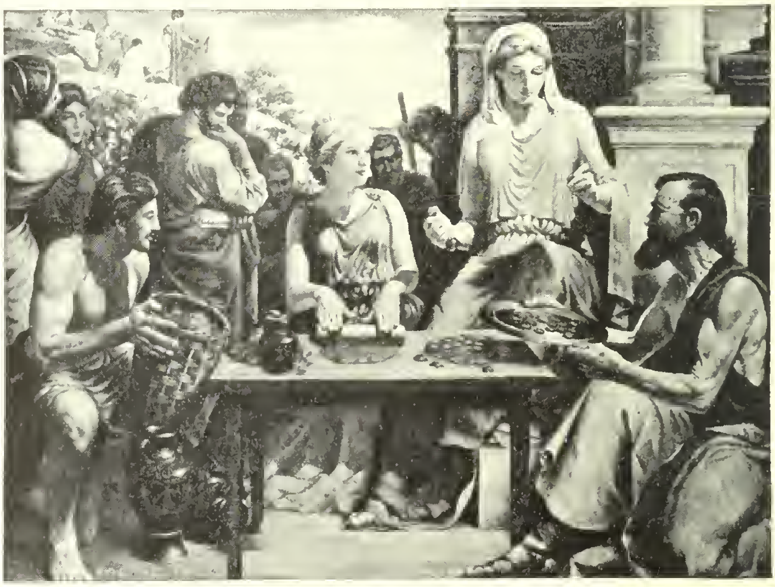
WANTED—UROLOGIST: Board certified or qualified; 14 man group located in North Dakota city of 40,000; well established; salary & %, with view to partnership. Box 936, c/o The Journal-Lancet.

Parke, Davis & Company . . . *Paintings of History of Pharmacy*

Representing over 12 years of study and research Parke, Davis and Company, Detroit, commissioned Robert A. Thom to produce 30 original oil paintings depicting dramatic highlights in the early history of pharmacy.

These paintings will be produced over a 5 year period. The project was conceived and directed by George A. Bender, editor of *Modern Pharmacy*. Intensive investigation and the assistance of expert advisors contribute to the accuracy and authenticity of the paintings.

Reproduced here is Number 7 of the 14 that have already been completed. It is entitled "Terra Sigillata" and represents the first "Trade Marked" drug.



Man learned early of the prestigious advantage of trade marks as a means of identification of source and of gaining customers' confidence. One of the first therapeutic agents to bear such a mark was "Terra Sigillata" (Sealed Earth), a clay tablet originating on the Mediterranean Island of Lemnos before 500 B.C.

One day each year clay was dug from a pit on a Lemnian hillside in the presence of governmental and religious dignitaries. Formed into pastilles and impressed with an official seal by priestesses, it was then widely distributed commercially.

41B
132